Course Description: In an ever-changing world, technological change both influences policy decisions and is influenced by policy. This course looks at the interaction of policy and technological change from both directions. Throughout the course, we will use examples from current policy debates to highlight important issues. The course begins with an introduction to the economic analysis of knowledge. Economists consider the creation of knowledge to be a public good. We ask why that is, and discuss how the public goods nature of knowledge affects the creation of new knowledge. We then ask how government policy, such as patent protection and government funded R&D, influences the development of new technologies. Next, we look at the diffusion of knowledge. We examine the role that knowledge plays in the economic growth of nations and look at how new knowledge is transferred, both in the industrialized world and to developing countries. Relevant policy questions include whether drug companies should receive patent protection in developing countries. Finally, we conclude by considering how technological change affects policy. For example, should sales taxes be collected on Internet purchases? How can health policy keep up with changing medical technologies? How does technological change affect the distribution of income?

Goals of the course: The main objective of this course is for you to learn how to think critically about issues relating to science and R&D. Upon completion of this course, you should be able to explain the economic rationale for government involvement in science policy, and be able to discuss what the impact of such involvement will be. In particular, it is hoped that the class will provide you with a better understanding of current issues relating to science and innovation.

Accomplishing these goals requires not only a mastery of some basic economic tools, but also an ability to apply these tools to real world issues. As such, much of the content of the course will apply the basic tools that we discuss in class to current event issues.

Learning to apply economics to the real world takes practice. The assignments for this class are designed to get you thinking and writing using economic analysis. In addition, classroom discussion plays an important role in developing the skills to apply economic theory to the real world. Active participation in discussions, both in class and via e-mail (discussed below) is vital to success in this course. For this reason, class participation will count towards ten percent of your course grade. Don’t be afraid to participate because you feel what you have to say isn’t important or may not be correct. Many of the things we will discuss in this class have no right answers. Your opinions matter! The class participation grade will consist of two components: participation in general class discussions and participation in discussions on the class e-mail discussion list. I will occasionally use the list to post follow-up questions to topics discussed in class.

Prerequisites: The prerequisite for this course is PPA 723, Managerial Economics for Public Administrators, or an equivalent course in microeconomics. If you have any questions about whether or not you have taken an appropriate course, please see me as soon as possible.
Class Home Page: The home page for this class is:

http://classes.maxwell.syr.edu/ppa730-05/index.html

You can also connect to the home page through my personal home page, which can be found at:

http://faculty.maxwell.syr.edu/dcpopp/index.html

The web site includes information about assignments, summaries of lectures, and links to other useful economic sites. These links may be particularly useful as you work on your research paper.

E-mail: All students in the class are required to have an e-mail account and to check e-mail regularly. An e-mail discussion list will be set up for the class, to which you should subscribe. Information on how to subscribe is included below. Participation in a class e-mail discussion list makes up part of your class participation grade. In addition, I will occasionally make announcements about assignments and class material via the discussion list. Not subscribing is not an appropriate excuse for missing these announcements.

E-mail discussion group: I have set up an e-mail discussion group for the class. All students are expected to subscribe to the mailing list. You may use this list for any class related activities, such as asking questions, continuing discussions from class, and instigating new discussions. I will use the list to keep you informed about assignments, answer questions, and instigate discussion. When messages are sent to the list, all students subscribed to the list will get the message.

To subscribe to the list, send an e-mail to listserv@listserv.syr.edu with the following message:

SUB EconSci Jan Smith

Note that this is all that need be in the body of the message, and that it must be typed in exactly as written, except, of course, that you should replace your name for Jan Smith. When you sign up, you will receive a message with detailed instructions for participating in the mailing list. This message will ask that you reply, so as to confirm that you intended to join the list. It is important that you remember to reply, or else you will not be added to the list!

A couple of technical notes: E-mails sent to the list are sent to EVERYONE who subscribes to the list. If you want to send a personal e-mail to a specific class member (or to me), use their e-mail address, not the list's address. The list is a good place to ask questions about class materials, because everyone can see the answer. It is not the way to let me know that you are going to miss class on Wednesday. For that you should send an e-mail to me personally. Also, I am considered the owner of this list. If you experience any problems, please e-mail me directly. My e-mail address is dcpopp@maxwell.syr.edu.
**Reading:** The textbook for this class is *Technology, Growth, and Development: An Induced Innovation Perspective* by Vernon W. Ruttan. The text is available at the Orange Bookstore. There are several additional articles intended to supplement the text. When possible, links to these articles are provided on the web site. Articles not available on the Internet are included in a reading packet available for sale at the Campus Copy Center in Marshall Square Mall. Ask for reader No. 1116.

The additional readings have two purposes: to expose you to influential work in the economics of innovation and to highlight the relevance of these theories to current events. The first goal is accomplished through journal articles written by professional economists. At times, these articles may get quite technical. When that occurs, you are encouraged to focus on the main arguments and conclusions of the paper, and to simply browse through the technical parts. The second goal is met by several shorter articles taken from current events publications. Articles in the reading packet taken from the *Journal of Economic Perspectives* are particularly useful, as they fall under both categories. These articles usually provide summaries of work done by professional economists on current events issues. You may also find it helpful to consult other articles in this journal for paper ideas.

In addition to required readings, the syllabus also includes optional articles. These are marked with an asterisk (*). They are not included in the reading packet, but should be available at the library or on-line. Optional articles provide more detail on selected topics, and may be helpful for your research papers. In particular, Ph.D. students should find the optional articles a useful way to increase their exposure to the economic literature in the field.

**Grading:** *Masters’ Students:* Your grade in this course will be based on participation in class and e-mail discussions (10%), two take home quizzes (15% each), participation in the Pharmaceutical Policy Simulation (10%), a take home final exam (20%), and a research paper (30%). The take home quizzes will be handed out in class, and due the following class meeting. They will focus on applications of the material discussed in class, and will be in the form of short problem or essay questions. The take home final will be given during the final exam period.

*Ph.D. Students:* In order to get you thinking about the research process, the assignments for Ph.D. students vary slightly. Ph.D. students will participate in the policy simulation, and will do a research paper. However, rather than take the exams, Ph.D. students will be expected to do a referee report of a working paper in the field. In addition, the requirement for the research paper will be different. Ph.D. students should consider the paper to be a research proposal. That is, in addition to identifying an interesting question, you should think about *how* you would go about answering the question. Note that, given the time constraints of a one-semester course, it is not necessary that you carry out the research. The grading for Ph.D. students will be: participation in class and e-mail discussions (10%), participation in the Pharmaceutical Policy Simulation (10%), the referee report (30%), and a research paper (50%).

*In compliance with section 504 and the Americans with Disabilities Act (ADA)*, *Syracuse University is committed to ensure that “no otherwise qualified individual with a disability...shall, solely by reason of disability, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity...”* If you feel that you are a student who may need academic accommodations due to a disability, then you should immediately register with the Office of Disability Services (ODS) at 804 University Ave., Room 309 3rd Floor, 315-443-4498 or 315-443-1371 (TDD only). ODS is the Syracuse University office that authorizes special accommodations for students with disabilities.

Finally, note that if you miss a class, it is your responsibility to find out if you missed any assignments or handouts. Not being present when an assignment was given out is **not** an acceptable excuse for missed or late work!
Research Paper: The major assignment for this class is a semester-long research paper on a topic of your choosing. The research paper will be due on the last day of class. It should be between 10 and 15 pages, double-spaced. I will hand out more details on the paper, including suggestions for topics, further into the course. The paper should apply the materials of the course to a public policy question. It should include a summary of the relevant theory that applies to your topic, and apply the theory to the problem to reach a conclusion. To make sure that you are on the right track, a one-page statement of your proposed research topic is due Tuesday, March 4. In it, you should state the question that you wish to address, briefly describe why it is important, and propose the means by which you will analyze your proposed topic. The final paper will be due at the beginning of our last class meeting on Tuesday, April 29.

Policy Simulation: The Pharmaceutical Policy Simulation, held on April 22, will give you a chance to make use of many of the things we have discussed in class in an actual policy setting. Students will be assigned to groups representing various players in the debate over patenting pharmaceuticals in developing countries – such as the US, South Africa, India, pharmaceutical companies, and NGOs such as Doctors without Borders. Each group will be responsible for preparing a 2-3 page policy brief that outlines your goals. The simulation will begin with a five-minute presentation from each group outlining these goals. The remainder of the class will be left for negotiations among the groups. Please note that there will be no formal class meeting on April 15. You should make use of this time to meet as a group and prepare your presentations. Attendance at the simulation is important, and makes up 10% of your grade for the course. If you will be unable to attend, please let me know in advance. Unexcused absences will receive a zero for that portion of your grade.
Reading List

I. Introduction
January 14 – Introduction
Reading: Ruttan, Chapter 1

II. The Economics of Knowledge
January 16 – What is Science?


January 21 – Knowledge as a Public Good


January 23 – Measuring Knowledge


III. Sources of Technological Change
January 28 & 30 – Sources of Technological Change
Reading: Ruttan, Chapters 3 & 4


IV. Policies to Promote Innovation

February 4 – What is Intellectual Property Protection (IPP)?


February 6 – How Firms Use Intellectual Property Protection


February 11 – IPP Policy Issues


February 13 – Case: Medical Biotechnology


February 18 & 20 – Government Subsidies of R&D
  Reading: Ruttan, chapter 13, pp. 534-562.

Take home quiz 1 handed out in class on Thursday, February 20. Due in Class Tuesday, February 25.

V. Diffusion of Knowledge
  February 25 – Theories of Diffusion
  Reading: Ruttan, Chapter 5

February 27 – Technology Transfer

March 4 – Government Policy For Diffusion
  Reading: Ruttan, Chapter 13, pp. 563-590.

Statement of Research Topic Due Tuesday, March 4

March 6 – A Comparison of Technology Policies
  Reading: Ruttan, Chapter 11.
VI. International Technology Diffusion
March 18 & 20 – International Technology Diffusion

March 25 – International Technology Policy
(NOTE: not in packet)

March 27 – Case: Agricultural Biotechnology

Take home quiz 2 handed out in class on Thursday, March 27. Due in Class Tuesday, April 1.
VII. Technology and Economic Growth

April 1 – Introduction to Economic Growth

Reading: Ruttan, chapter 2.

April 3 – Is There a “New Economy”?

“Economic Focus: Productivity Growth (con’t),” *The Economist*, September 8, 2001, p. 82.

April 8 – The Effects of Technology and Globalization


April 10 – The Digital Divide

VI. Policy Issues

April 15 – NO CLASS – prepare for Pharmaceutical Simulation

Readings for Simulation: Drug Patents in Developing Countries


“A war over drugs and patents,” *The Economist*, March 10, 2001, pp. 43-44.


April 17 – Technology and Health Care


April 22 – Pharmaceutical Policy Simulation
April 24 – Technology and the Environment


April 29 – Antitrust Issues


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RESEARCH PAPERS DUE IN CLASS TUESDAY, APRIL 29

TAKE HOME FINAL EXAM TO BE HANDED OUT DURING EXAM WEEK