Course Syllabus
ENCE 722
Market, Spatial, and Traffic Equilibrium Models in Project Management

COURSE DESCRIPTION

ENCE 722 Market, Spatial, and Traffic Equilibrium Models in Project Management (3) This course provides motivation and introduction to equilibrium models involving economics and engineering. We will concentrate on models involving markets (Nash-Cournot, etc.), those wherein the activities are spatially diverse, and those involving energy activities or traffic flow. Areas that will be covered include:

- Review of relevant optimization theory
- Presentation of the nonlinear complementarity problem (NCP) and variational inequality problem (VIP) formats to solve equilibrium problems as well as introduction to existence and uniqueness results
- Review of relevant game theory notions
- Presentation of specific models for market, spatial, energy, and traffic equilibrium problems
- Presentations for algorithms to solve these equilibrium problems

TEXTBOOKS

- P. T. Harker, Lectures on Computation of Equilibria with Equation-Based Methods, CORE Lecture Series, Université catholique de Louvain, Louvain-la-Neuve, Belgium, 1993. (Will also be available for purchase from the Civil & Env. Eng. Dept)

COURSE OBJECTIVES

- Provide understanding for studying problems that involve equilibrium concepts in settings that involve engineering and economics
- Learn about various equilibrium formulations relevant to engineering and economic settings
- Present theory for solutions to such problems
- Present algorithms to solve these problems

**COURSE ADMINISTRATION**

Students are encouraged to attend all lectures since the take-home exam and the homework will be closely related to material discussed in lectures. In addition, class participation is taken into account as part of the homework grade.

It is assumed that students will complete the homeworks by themselves although casual discussion with other class members is allowed. Homeworks will generally be given out each week and due at the start of class one week later.

The course is subject to the Code of Academic Integrity and Honor Pledge available on the web at [http://www.studenthonorcouncil.umd.edu/index.html](http://www.studenthonorcouncil.umd.edu/index.html). They prohibit students from cheating on exams, plagiarizing papers, submitting the same paper for credit in two courses without authorization, buying papers, submitting fraudulent documents, and forging signatures. The instructor is not reluctant to assign the grade “XF” for the course should any of the above obtain.

The University has a legal obligation to provide appropriate accommodations for students with disabilities. Please inform the instructor of any accommodations needed relative to disabilities. Also, University of Maryland policy states that students should not be penalized due to observances of their religious beliefs. Please inform the instructors of such instances well in advance.

**INSTRUCTOR**

**Dr. Steven A. Gabriel**
Telephone: (301) 405-3242 | Fax: (301) 405-2585 | Office: EGR 1143
Email: sgabriel at umd.edu

**GRADING**

Grading is based on comprehension and mastery of the material.

- Weekly/biweekly homeworks (students hand in at start of class-no late homeworks accepted)
- Non-cumulative take-home exam (exam #1)
- Non-cumulative in-class exam (exam #2)
- Final project (proposal, presentation, report)

The distribution of the grade is as follows:

- Homeworks 20%
- \( \min\{\text{exam } #1 \text{ score, exam } #2 \text{ score}\} \) 20%
- Max\{exam \#1 score, exam \#2 score\} 30%
- Projects 30%