Many phenomena that marketing managers face involve dynamic decisions. These decisions must take into account not only the current effects of any action but also future effects throughout the planning horizons. These phenomena include introduction of new products, investment in advertising, advertising budget allocation over time, pricing of new products in multiple-segment markets, and decisions concerning channels of distributions.

In the past thirty years, researchers in marketing have developed an area that deals specifically with solutions to such dynamic issues facing the firm. These issues include formulation and solution using optimal control, differential games, dynamic discrete games, and complex analysis. This seminar deals with these issues both in terms of the problems setting and the proposed quantitative solutions.

The seminar includes the following five parts, where the first part deals with the methods and the rest with marketing applications:

a) Methods of optimal control and complex analysis
b) Diffusion and adoption of new products
c) Dynamic pricing
d) Discrete non-cooperative games
e) Complex analysis

(a) Optimal control and complex analysis
The theory of optimal control, differential games techniques, and complex analysis, which are fundamental to the rest of the seminar, will be given by the instructor in the time-honored style of frontal lectures. In optimal control we will follow the book by Kamien and Schwartz (pp. 111- 158): Morton I. Kamien and Nancy L. Schwartz (1981): Dynamic Optimization, New York, North Holland. In complex analysis we will use cellular automata and small-world techniques using Excel spreadsheets. Some of the papers and sample spreadsheets are available at www.complexmarkets.com. Prior knowledge is not required but familiarity with calculus and ease of use of Excel is assumed.

Following the first part of the course in which the techniques are explained, the students will present papers from the following list:
(b) Diffusion and adoption of new products


(c) Dynamic pricing and advertising


(d) Discrete non-cooperative games


(e) Complex analysis
