

**Purdue University
Department of Agricultural Economics**

**Fall 2016
AGEC 654
Economic Dynamics
Course Description**

Instructors: Juan P. Sesmero and Michael E. Wetzstein

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I. Intent: The course is intended to integrate economic theory with its application. The objective is to narrow the gap between theory and practice through the solving of numerical dynamic problems. These problems illustrate how to make the theory operational and how to apply numerical techniques to solve the equations, which define a potential solution.

II. Textbook: Miranda, M. and P. Fackler, *Applied Computational Economic and Finance*, MIT Press, 2002.

III. Grading:

A. Two Examinations

Midterm, November 7, 2016 - 25% of grade

Final, Friday December ?, 2016, 8:00 - ?? - 25% of grade

B. Joint Problem Sets, 25% of grade

C. Research Project, 25% of grade

**Tentative Schedule of Lecture Topics,
Problem Sets, and Examinations**

| WEEK | DATE | LECTURE TOPIC | PROBLEM SETS |
|------|-------------|---|-------------------------------|
| 1 | August 23 | Introduction (Ch 2) | P.S. #1 Assigned |
| | 25 | Calculus of Variation (Ch 3) | |
| 2 | 30 | S.O.C. | |
| | September 1 | Transversality Conditions | P.S. #1 Due, P.S. #2 Assigned |
| 3 | 6 | Maximum Principle (Ch 4) | |
| | 8 | Interpretation of the Necessary Conditions | P.S. #2 Due, P.S. #3 Assigned |
| 4 | 13 | Transversality Conditions | |
| | 15 | Example | P.S. #3 Due, P.S. #4 Assigned |
| 5 | 20 | Example (Conrad and Clark p. 37-40) | |
| | 22 | Dynamic Programming (Ch 5) Dynamic Programming (Conrad and Clark p. 22-24) | P.S. #4 Due, P.S. #5 Assigned |
| 6 | 27 | Discrete Time Dynamic Control Mine Manager Problem (Conrad and Clark p. 19-21) | P.S. #5 Due, P.S. #6 Assigned |
| | 29 | Discounting (Conrad and Clark p. 31-33) | |
| 7 | October 4 | Nonlinear Equations (Miranda and Fackler, Ch 3) | |
| | 6 | Finite-Dimensional Optimization (Miranda and Fackler, Ch 4) | |
| | 7 | Midterm Examination | |
| 8 | 13 | Answers to Examination | P.S. #6 Due, P.S. #7 Assigned |

| WEEK | DATE | LECTURE TOPIC | PROBLEM SETS |
|------|------------|---|--------------|
| 9 | October 18 | Newton-Raphson Method | |
| | 20 | Numerical Integration and Differentiation (Miranda and Fackler, Ch 5) | |
| 10 | 25 | Function Approximation (Miranda and Fackler, Ch 6) | |
| | 27 | Discrete Time, Discrete State Dynamic Models (Miranda and Fackler, Ch 7) | |
| | | | P.S. #7 Due |
| 11 | November 1 | Method | |
| | 3 | Examples | |
| 12 | 8 | Discrete Time, Continuous State Dynamic Models (Miranda and Fackler, Ch 8) | |
| | 10 | Method | |
| 14 | 15 | Examples | |
| | 17 | Discrete Time, Continuous State Dynamic Models Methods (Miranda and Fackler, Ch 9) | |
| 15 | 22 | Method | |
| 1 | 29 | Example | |
| | December 1 | Real Options Analysis | |
| 16 | 6 | Basis Model | |
| | 8 | Examples | |
| 17 | | Final Examination | |
| 17 | ? | End of Semester Party | |