

**Economics 4775/7775
Dynamic Optimization
Spring 2020**

Instructor: Dr. X. H. Wang
125 Professional Building
(573) 882-4954
wangx@missouri.edu

Office Hours: 1pm – 3pm Tuesdays, or by appointment

Class Time and Location: MW 1pm – 2:15pm Middlebush 11

Course Webpage: Canvas at <https://courses.missouri.edu/>

Course Description: This course will provide an introduction to economic dynamics. Topics include continuous and discrete dynamic systems, optimal control theory, dynamic programming in discrete time variables, and applications to various economic problems. Such concepts as the Maximum Principle and the Bellman Equation will be learnt.

Prerequisite: Economics 4370/7370 (Quantitative Economics) or equivalent, or instructor's consent.

Textbook: Ronald Shone, **Economic Dynamics**, 2nd Edition

Supplemental Books: Kamien & Schwartz, Dynamic Optimization
Leonard & Van Long, Optimal Control Theory and Static Optimization in Economics
Stokey & Lucas, Recursive Methods in Economic Dynamics

Grading: Grades for the course will be determined by class participation and homework assignments (20%), and two tests (40% each). Plus/minus grades will be used.

Test Schedule:

Test I	March 11 Wednesday
Test II	TBA

Make-up Exams: Make-up exams will generally not be given. A request for alternative arrangements must be in writing and must be accompanied by appropriate documentation for not taking the scheduled exam.

Major Topics

Readings

I. Continuous Dynamic Systems

Ch. 2, 4, 6, 8-10 of Shone

Continuous dynamic systems
System of first-order differential equations
Optimal Control Theory
Hamiltonian system
Pontryagin maximum principle
Euler equation
Phase diagram
Applications

II. Discrete Dynamic Systems

Ch. 3, 5, 8-10 of Shone

Discrete dynamic systems
Discrete systems of equations
Applications

III. Dynamic Programming

Lecture Notes

Value function
Bellman equation
Applications

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Academic honesty is fundamental to the activities and principles of a university. All members of the academic community must be confident that each person's work has been responsibly and honorably acquired, developed, and presented. Any effort to gain an advantage not given to all students is dishonest whether or not the effort is successful. The academic community regards academic dishonesty as an extremely serious matter, with serious consequences that range from probation to expulsion. When in doubt about plagiarism, paraphrasing, quoting, or collaboration, consult the course instructor.

Academic Dishonesty includes but is not necessarily limited to the following:

- A. Cheating or knowingly assisting another student in committing an act of cheating or other academic dishonesty.
- B. Plagiarism which includes but is not necessarily limited to submitting examinations, themes, reports, drawings, laboratory notes, or other material as one's own work when such work has been prepared by another person or copied from another person.
- C. Unauthorized possession of examinations or reserve library materials, or laboratory materials or experiments, or any other similar actions.
- D. Unauthorized changing of grades or markings on an examination or in an instructor's grade book or such change of any grade report.

ACADEMIC INTEGRITY PLEDGE: *"I strive to uphold the University values of respect, responsibility, discovery, and excellence. On my honor, I pledge that I have neither given nor received unauthorized assistance on this work."* Students are expected to adhere to this pledge on all graded work whether or not they are explicitly asked in advance to do so.

The University has specific academic dishonesty administrative [procedures](#). Although policy states that cases of academic dishonesty must be reported to the Office of the Provost for possible action, the instructor may assign a failing grade for the assignment or a failing grade for the course, or may adjust the grade as deemed appropriate. The instructor also may require the student to repeat the assignment or to perform additional assignments. In instances where academic integrity is in question, faculty, staff and students should refer to [Article VI of the Faculty Handbook](#). Article VI is also available in the [M-Book](#). Article VI provides further information regarding the process by which violations are handled and sets forth a standard of excellence in our community.

ADA STATEMENT (FROM OFFICE OF THE PROVOST)

If you anticipate barriers related to the format or requirements of this course, if you have emergency medical information to share with me, or if you need to make arrangements in case the building must be evacuated, please let me know as soon as possible.

If disability related accommodations are necessary (for example, a note taker, extended time on exams, captioning), please register with the *Disability Center* (<http://disabilitycenter.missouri.edu>), S5 Memorial Union, 573- 882-4696, and then notify me of your eligibility for reasonable accommodations. For other MU resources for persons with disabilities, click on "Disability Resources" on the MU homepage.

Intellectual Property Notice

All course materials including but not limited to the syllabus, course assignments, study guides, learning guides, online lecture videos and content, and lab book (i.e. course pack) are property of the instructor and

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Audio/Video Recording

University of Missouri System Executive Order No. 38 lays out principles regarding the sanctity of classroom discussions at the university. The policy is described fully in Section 200.015 of the Collected Rules and Regulations. In this class, students may not make audio or video recordings of course activity, except students permitted to record as an accommodation under Section 240.040 of the Collected Rules. All other students who record and/or distribute audio or video recordings of class activity are subject to discipline in accordance with provisions of Section 200.020 of the Collected Rules and Regulations of the University of Missouri pertaining to student conduct matters.

Those students who are permitted to record are not permitted to redistribute audio or video recordings of statements or comments from the course to individuals who are not students in the course without the express permission of the faculty member and of any students who are recorded. Students found to have violated this policy are subject to discipline in accordance with provisions of Section 200.020 of the Collected Rules and Regulations of the University of Missouri pertaining to student conduct matters.

INTELLECTUAL PLURALISM STATEMENT (FROM OFFICE OF THE PROVOST)

The University community welcomes intellectual diversity and respects student rights. Students who have questions concerning the quality of instruction in this class may address concerns to either the Departmental Chair or Divisional leader or Director of the [Office of Students Rights and Responsibilities](http://osrr.missouri.edu) (<http://osrr.missouri.edu>). All students will have the opportunity to submit an anonymous evaluation of the instructor(s) at the end of the course.

TITLE IX

University of Missouri policies prohibit discrimination on the basis of race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, pregnancy, age, genetic information, disability and protected veteran status. Discrimination includes any form of unequal treatment such as denial of opportunities, harassment, and violence. Sex-based violence includes rape, sexual assault, unwanted touching, stalking, dating/interpersonal violence, and sexual exploitation.

If you experience discrimination, you are encouraged (but not required) to report the incident to the MU Office for Civil Rights & Title IX. Learn more about your rights and options at civilrights.missouri.edu or call 573-882-3880. You also may make an anonymous report online.

Students may also contact the Relationship & Sexual Violence Prevention (RSVP) Center, a confidential resource, for advocacy and other support related to rape or power-based personal violence at rsvp@missouri.edu or 573-882-6638, or go to rsvp.missouri.edu.

Both the [Office for Civil Rights & Title IX](http://civilrights.missouri.edu) and the [RSVP Center](http://rsvp.missouri.edu) can provide assistance to students who need help with academics, housing, or other issues.