

**Survey of Mathematical Topics for Economists: Econ6040**  
**University of Manitoba, Department of Economics**  
**OUTLINE**  
**August 20-August 31, 2018**

**Instructor:** Professor Hikmet Gunay

**Office:** 511 Fletcher Argue Building

**Office Hours:** M, T, W, Th. 2.10-2.45 pm or by appointment. If you come to my office by 2.45 pm, I will be happy to answer your questions until 3.30 pm. Do not hesitate to use my office hours to ask your questions or need further clarifications.

**E-mail:** Hikmet.Gunay@umanitoba.ca

**Tel:** 474-8915

**Optional Textbook:** Alpha C. Chiang and Kevin Wainwright (2005), *Fundamental Methods of Mathematical Economics*. Fourth Edition or higher.

**Course Day, Hours, and Location:** Monday to Friday 10.00 am – 2.10 pm, Course location is 160 Elisabeth Dafoe Library. (The information is taken from Aurora-University of Manitoba)

**Teaching Assistant:** Mohamed Ebeid. TA will not hold office hours.

**Course Description and Objective**

The aim of the course is to familiarize you with the mathematical concepts used in economics. By the end of this course, you will have the basic mathematical knowledge that is used in the graduate program.

**Grading Scheme:** This is a pass/fail course. The following table explains the weight of each exam/quizzes/homework. If your total score (i.e., weighted average) is over 70 (out of 100), you pass the course. Otherwise, you fail.

	Weight	Date
Midterm I	40 %	Aug 24
Midterm II	40 %	Aug 30
Quiz	20 %	Aug 31

**Voluntary Withdrawal Date:** Students can voluntarily withdraw from the course by August 29<sup>th</sup>. Before withdrawing, I suggest that you talk to your advisor about the consequences of withdrawing. Evaluative feedback will be provided by the Voluntary Withdrawal (VW) deadline date since you will be learning your Midterm I grade.

**Assignments:** There may be daily assignments but no credits will be given for the assignments.

Students will be expected to put answers to assignments on the board each day, and to check each other's work. You can and should help each other on daily assignments. No collusion is permitted on exams/quizzes/midterms/final exam. See the academic integrity section for penalties.

**Policy on Make-up Exams and Late Assignments:** Students will not be permitted to write make-up tests or hand in assignments late, except for documented medical or compassionate reasons.

**Attendance:** Attendance is not required; however, students are responsible for the material covered in class.

### **Academic Integrity:**

University policy on academic integrity will be enforced. A full description of academic integrity matters, including plagiarism and cheating, can be found in the relevant section of the General Academic Regulations and Requirements of the University of Manitoba. Hence, students should acquaint themselves with the University's policy on plagiarism, cheating and examination impersonation.

Ignorance of the regulations and policies regarding academic integrity is not a valid excuse for violating them. Here is more information on plagiarism and cheating.

#### Plagiarism and Cheating

Plagiarism or any other form of cheating in examinations, term tests or academic work is subject to serious academic penalty (e.g. suspension or expulsion from the faculty or university). Cheating in examinations or tests may take the form of copying from another student or bringing unauthorized materials into the exam room (e.g., crib notes, pagers or cell phones). Exam cheating can also include exam impersonation. (Please see Exam Impersonation, found in the Examination Regulations section of the General Academic Regulations). A student found guilty of contributing to cheating in examinations or term assignments is also subject to serious academic penalty.

To plagiarize is to take ideas or words of another person and pass them off as one's own. In short, it is stealing something intangible rather than an object. Plagiarism applies to any written work, in traditional or electronic format, as well as orally or verbally presented work. Obviously it is not necessary to state the source of well known or easily verifiable facts, but students are expected to appropriately acknowledge the sources of ideas and expressions they use in their written work, whether quoted directly or paraphrased. This applies to diagrams, statistical tables and the like, as well as to written material, and materials or information from Internet sources.

To provide adequate and correct documentation is not only an indication of academic honesty but is also a courtesy which enables the reader to consult these sources with ease. Failure to provide appropriate citations constitutes plagiarism. It will also be considered plagiarism and/or cheating if a student submits a term paper written in whole or in part by someone other than

him/herself, or copies the answer or answers of another student in any test, examination, or take-home assignment.

Working with other students on assignments, laboratory work, take-home tests, or on-line tests, when this is not permitted by the instructor, can constitute Inappropriate Collaboration and may be subject to penalty under the [Student Discipline By-Law](#).

An assignment which is prepared and submitted for one course should not be used for a different course. This is called “duplicate submission” and represents a form of cheating because course requirements are expected to be fulfilled through original work for each course.

When in doubt about any practice, ask your professor or instructor.

The Student Advocacy Office, 519 University Centre, 474-7423, is a resource available to students dealing with Academic Integrity matters.

### **Policy on Unclaimed Term Work**

Any term work that has not been claimed by students will be held for four (4) months from the end of the final examination period for the term in which the work was assigned. At the conclusion of this time, all unclaimed term work will be destroyed according to FIPPA guidelines.

**Students appealing any term work** whether it be an informal or formal appeal, students must appeal their term work within 10 working days of receiving their mark.

**Course Outline:** We intend to cover the following topics/chapters –time permitting-. I reserve the right to change the topics or the order of topics that I will cover.

1. Logic and Set Theory.
2. Exponents and Logarithms.
3. Linear Models and Matrix Algebra.
4. Limits
5. Differentiation and Integrals
6. Constrained Optimization and Its Application to Economics (Chapter 12 and 13 of Chiang and Wainwright)
7. (Generally, we do not have time to cover this topic) Optimal Control Theory (Hamiltonians) and Dynamic Programming (Bellman Equation). (Chapter 20 of Chiang and Wainwright)

**Other information that the instructors are required to add to the outline per University of Manitoba rules.**

The following information may be used to fulfill the requirement of Schedule “A.” Such information is to be provided to students within the first week of classes, either through a paper copy and/or a University student information system (including Aurora or UM Learn).

**Section (a) sample re:** A list of academic supports available to Students, such as the Academic Learning Centre, Libraries, and other supports as may be appropriate:

**Writing and Learning Support**

The Academic Learning Centre (ALC) offers services that may be helpful to you throughout your academic program. Through the ALC, you can meet with a learning specialist to discuss concerns such as time management, learning strategies, and test-taking strategies. The ALC also offers peer supported study groups called Supplemental Instruction (SI) for certain courses that students have typically found difficult. In these study groups, students have opportunities to ask questions, compare notes, discuss content, solve practice problems, and develop new study strategies in a group-learning format.

You can also meet one-to-one with a writing tutor who can give you feedback at any stage of the writing process, whether you are just beginning to work on a written assignment or already have a draft. If you are interested in meeting with a writing tutor, reserve your appointment two to three days in advance of the time you would like to meet. Also, plan to meet with a writing tutor a few days before your paper is due so that you have time to work with the tutor’s feedback.

These Academic Learning Centre services are free for U of M students. For more information, please visit the Academic Learning Centre website at: <http://umanitoba.ca/student/academiclearning/>

You can also contact the Academic Learning Centre by calling 204-480-1481 or by visiting 201 Tier Building.

**University of Manitoba Libraries (UML)**

As the primary contact for all research needs, your liaison librarian can play a vital role when completing academic papers and assignments. Liaisons can answer questions about managing citations, or locating appropriate resources, and will address any other concerns you may have, regarding the research

process. Liaisons can be contacted by email or phone, and are also available to meet with you in-person. A complete list of liaison librarians can be found by subject: <http://bit.ly/WcEbA1> or name: <http://bit.ly/1tJ0bB4>. In addition, general library assistance is provided in person at 19 University Libraries, located on both the Fort Garry and Bannatyne campuses, as well as in many Winnipeg hospitals. For a listing of all libraries, please consult the following: <http://bit.ly/1sXe6RA>. When working remotely, students can also receive help online, via the Ask-a-Librarian chat found on the Libraries' homepage: [www.umanitoba.ca/libraries](http://www.umanitoba.ca/libraries).

**Section (b) sample:** re: A statement regarding mental health that includes referral information:

**For 24/7 mental health support, contact the Mobile Crisis Service at 204-940-1781.**

#### **Student Counselling Centre**

Contact SCC if you are concerned about any aspect of your mental health, including anxiety, stress, or depression, or for help with relationships or other life concerns. SCC offers crisis services as well as individual, couple, and group counselling. *Student Counselling Centre:*

<http://umanitoba.ca/student/counselling/index.html>

474 University Centre or S207 Medical Services  
(204) 474-8592

#### **Student Support Case Management**

Contact the Student Support Case Management team if you are concerned about yourself or another student and don't know where to turn. SSCM helps connect students with on and off campus resources, provides safety planning, and offers other supports, including consultation, educational workshops, and referral to the STATIS threat assessment team.

*Student Support Intake Assistant* <http://umanitoba.ca/student/case-manager/index.html>

520 University Centre  
(204) 474-7423

#### **University Health Service**

Contact UHS for any medical concerns, including mental health problems. UHS offers a full range of medical services to students, including psychiatric consultation.

*University Health Service* <http://umanitoba.ca/student/health/>

104 University Centre, Fort Garry Campus  
(204) 474-8411 (Business hours or after hours/urgent calls)

## Health and Wellness

Contact our Health and Wellness Educator if you are interested in information on a broad range of health topics, including physical and mental health concerns, alcohol and substance use harms, and sexual assault.

Health and Wellness Educator <http://umanitoba.ca/student/health-wellness/welcome.html>

[Katie.Kutryk@umanitoba.ca](mailto:Katie.Kutryk@umanitoba.ca)

469 University Centre  
(204) 295-9032

## Live Well @ UofM

For comprehensive information about the full range of health and wellness resources available on campus, visit the Live Well @ UofM site:

<http://umanitoba.ca/student/livewell/index.html>

**Section (c) sample:** re: A notice with respect to copyright:

All students are required to respect copyright as per Canada's *Copyright Act*. Staff and students play a key role in the University's copyright compliance as we balance user rights for educational purposes with the rights of content creators from around the world. The Copyright Office provides copyright resources and support for all members of the University of Manitoba community.

Visit <http://umanitoba.ca/copyright> for more information.

**Section (d) sample:** re: A statement directing the student to University and Unit policies, procedures, and supplemental information available on-line:

## Your rights and responsibilities

As a student of the University of Manitoba you have rights and responsibilities. It is important for you to know what you can expect from the University as a student and to understand what the University expects from you. Become familiar with the policies and procedures of the University and the regulations that are specific to your faculty, college or school.

The [Academic Calendar](#)

<http://umanitoba.ca/student/records/academiccalendar.html> is one important source of information. View the sections *University Policies and Procedures* and *General Academic Regulations*.

While all of the information contained in these two sections is important, the following information is highlighted.

- If you have questions about your grades, talk to your instructor. There is a process for term work and final **grade appeals**. Note that you have the right to access your final examination scripts. See the Registrar's Office website for more information including appeal deadline dates and the appeal form <http://umanitoba.ca/registrar/>
- You are expected to view the General Academic Regulation section within the Academic Calendar and specifically read the **Academic Integrity** regulation. Consult the course syllabus or ask your instructor for additional information about demonstrating academic integrity in your academic work. Visit the Academic Integrity Site for tools and support <http://umanitoba.ca/academicintegrity/> View the **Student Academic Misconduct** procedure for more information.
- The University is committed to a respectful work and learning environment. You have the right to be treated with respect and you are expected to conduct yourself in an appropriate respectful manner. Policies governing behavior include the:

### **Respectful Work and Learning Environment**

[http://umanitoba.ca/admin/governance/governing\\_documents/community/230.html](http://umanitoba.ca/admin/governance/governing_documents/community/230.html)

### **Student Discipline**

[http://umanitoba.ca/admin/governance/governing\\_documents/students/student\\_discipline.html](http://umanitoba.ca/admin/governance/governing_documents/students/student_discipline.html) and,

### **Violent or Threatening Behaviour**

[http://umanitoba.ca/admin/governance/governing\\_documents/community/669.html](http://umanitoba.ca/admin/governance/governing_documents/community/669.html)

- If you experience **Sexual Assault** or know a member of the University community who has, it is important to know there is a policy that provides information about the supports available to those who disclose and outlines a process for reporting. The **Sexual Assault** policy may be found at: [http://umanitoba.ca/admin/governance/governing\\_documents/community/230.html](http://umanitoba.ca/admin/governance/governing_documents/community/230.html) More information and resources can be found by reviewing the Sexual Assault site <http://umanitoba.ca/student/sexual-assault/>
- For information about rights and responsibilities regarding **Intellectual Property** view the policy [http://umanitoba.ca/admin/governance/media/Intellectual\\_Property\\_Policy\\_-\\_2013\\_10\\_01.pdf](http://umanitoba.ca/admin/governance/media/Intellectual_Property_Policy_-_2013_10_01.pdf)

For information on regulations that are specific to your academic program, read the section in the Academic Calendar and on the respective faculty/college/school web site <http://umanitoba.ca/faculties/>

Contact an **Academic Advisor** within our faculty/college or school for questions about your academic program and regulations <http://umanitoba.ca/academic-advisors/>

### **Student Advocacy**

Contact Student Advocacy if you want to know more about your rights and responsibilities as a student, have questions about policies and procedures, and/or want support in dealing with academic or discipline concerns.

<http://umanitoba.ca/student/advocacy/>

520 University Centre

204 474 7423

[student\\_advocacy@umanitoba.ca](mailto:student_advocacy@umanitoba.ca)