

**University of Manitoba
Faculty of Arts
Department of Economics**

COURSE DETAILS

Course Title and Number: Introduction to Game Theory, ECON 2610 A01 (CRN14437)

Number of Credit Hours: 3

Class Times and Days of Week: 10:30 a.m.-11:20 a.m., Monday, Wednesday and Friday

Location for classes: 303 Tier

Pre-Requisite: A grade of “C” or better in ECON 1010 or ECON 1011 or the former ECON 1200 (018.120) or the former ECON 1201, or a grade of “C” or better in both ECON 1210 (or ECON 1211 (018.121)) and ECON 1220 (or ECON 1221 (018.122)).

INSTRUCTOR CONTACT INFORMATION

Instructor Name: Dr. Irwin Lipnowski

Preferred Form of Address: Dr.

Office Location: 503 Fletcher Argue Building

Office Hours: Monday and Wednesday, 11:40 a.m.-12:25 p.m. or by appointment.

Instructor’s Phone Number: 204-4749192

Instructor’s E-mail: Irwin.Lipnowski@umanitoba.ca

E-mails will be answered: Within 24 hours between Monday and Thursday. An E-mail received on Friday will be answered by the following Monday.

Contact: If you wish to contact me outside of class time or my office hours, please email me.

E-mail Communication: If you send an email, please include your name, student number, and the course (including lecture time of the course). There are close to 200 students in the 3 courses I teach in the Fall Term. Please do not use emoticons.

Teaching Assistant: Ms. Sanchita Sarker

Ms. Sarker’s Office Hours and Location: TBA

Textbook (required): Robert Gibbons, Game Theory for Applied Economists, Princeton University Press, Princeton, NJ, 1992.

GENERAL COURSE INFORMATION

Game theory provides a framework, including concepts, tools and techniques, to analyze situations that involve two or more **interacting** “players” (or individuals, or agents, or parties). When the payoff to an agent depends not only on the action taken by that agent but depends as well on the action taken by the other agent(s), we have a situation that is described as “a game”. For this reason, the study of decision-making by agents in the setting of a game has been described as “**interactive decision theory.**”

If the agents’ interests coincide, i.e., their interests are perfectly aligned, we speak of a “co-ordination game”.

When agents’ interests are completely opposed, we have a game of “pure conflict”. Such games are sometimes described as “zero sum games”, or “constant sum games” since one party’s gain is the other party’s loss.

Most games involve a combination of conflict and cooperation.

Game theory was invented by one of the great mathematicians in the 20th century, John von Neumann, in collaboration with an economist at Princeton University, Oskar Morgenstern. Their groundbreaking book, *Theory of Games and Economic Behavior* (Princeton University Press, 1944) marked the birth of game theory.

Game theory has provided rigorous concepts and tools of analysis in every area of social sciences including economics, political studies, sociology, psychology, as well as several branches of law, computer science, environmental engineering, traffic engineering and evolutionary biology. This is a partial list.

FORMAT OF THE COURSE

This course will be taught in a lecture format. Since the prerequisite for this course is not beyond a grade of C in 1010 and 1020, considerable time will be allocated to explaining the basic elements of game theory. The concepts of a payoff, an action, a strategy, a mixed strategy, a game in normal form, a game in extensive form, an information set, and “moving simultaneously” (as used in game theory, not in everyday usage) will all be explained.

The textbook by Robert Gibbons focuses only on “non-cooperative” games. There is a vast literature dealing with “cooperative” games, the groundwork for which was laid by von Neumann and Morgenstern in their pioneering book. The essential difference between cooperative and non-cooperative games will be explained in a lecture.

The central solution concept used in non-cooperative games is **Nash equilibrium**. This will be defined, explained, and illustrated in a variety of examples, including the Cournot model of duopoly, prisoner’s dilemma, matching pennies, battle of the sexes and tragedy of the commons. The technique for solving games having a strongly dominant strategy (such as the prisoner’s

dilemma game) will be presented. For games having “weakly dominated” strategies, the technique for solving such games, the “iterated elimination of weakly dominated strategies” (IEWDS) will be illustrated, and possible problems that might arise when IEWDS is used will be discussed.

A problem with Nash equilibrium solution concept will be illustrated by two examples—the “entry game” involving an incumbent monopoly firm and a potential entrant, and a normal form game having a weakly dominant strategy. In each of these examples, there are two Nash equilibria pairs of strategies, only one of which is reasonable. A particular refinement of the Nash equilibrium concept, one such refinement for each example, eliminates the unreasonable Nash equilibrium solution of the game.

Because students are not required to have a Microeconomics background beyond an introductory level, no assumption will be made that students have previously been taught the Cournot and Bertrand duopoly models, or the two-stage version of the Cournot model developed by Stackelberg. Therefore, these models will be explained as their game-theoretic content is simultaneously being taught. The Gibbons textbook also assumes that students have a background in mathematics at a level of univariate calculus, topics will be presented at a pre-calculus level.

If time permits, I will introduce the solution concept from “cooperative” game theory that is most commonly found in economics: “the core”. The geometric technique for determining whether the core exists in a given game or does not—in the latter case we say “the core is empty”—will be explained using an equilateral triangle. This geometrical method will determine the possible value(s) of the core when it exists.

The course content for non-cooperative games will not proceed beyond Chapters 1 and 2 in the textbook, covering static and dynamic games of complete information, and includes an introduction to the concept of a mixed strategy, the refinement of Nash equilibrium called “subgame perfect Nash equilibrium”, and the theory of repeated games.

Students are responsible on the tests for all subject matter that is covered during lectures. Regular attendance, concentration during lectures and taking careful notes, followed by carefully reviewing the material presented during lectures and the corresponding material in the textbook in order to reinforce your understanding, is highly recommended if your goal is to learn the subject matter and to do well in the course.

METHOD OF EVALUATION

The final grade will be based on ***five 50 minute in-class tests***. ***There is no final exam.***

The tests will consist of analytical questions (where students might typically be required to “explain” a concept, or to “derive” some concept or results). The course content covered in each test will be based on material covered during lectures following the previous test. The first test material will be based on the first five lectures.

The dates of the four 50 minute in-class tests are:

- Test 1: Monday, September 26, 2016
- Test 2: Monday, October 17, 2016
- Test 3: Friday, November 4, 2016
- Test 4: Friday, November 25, 2016
- Test 5: Friday, December 9, 2016

Each test will be graded out of 20 marks. **Only your three highest test scores on your first four tests will count in determining your final grade.**

After dropping your lowest test result for the first four tests, the sum of your test results for three highest marks achieved on the first four tests will be adjusted to give your best three test scores a mark having a maximum possible weight of 80% of your final grade (by multiplying the sum of your best three tests by 1.33). Test 5 will have a weight of 20% of your final grade. Fractional marks on tests will be retained until calculating the final numerical grade. If at that final stage a fraction is below 0.5, it will be rounded off to 0. If it is 0.5 or more, it will be rounded up to 1. Once your final numerical grade out of 100 is calculated, it will be converted to a letter grade according to the following scale:

0-49 = F; 50-54 = D; 55-60=C; 61-66 = C+;
67-74 = B; 75-79 = B+; 80-89 = A; 90-100 = A+

Note that with respect to the first four tests, students can see me-- if they feel their tests were unfairly graded—**no later than 10 working days after the return of a test.**

THE UNIVERSITY OF MANITOBA POLICY ON ACADEMIC INTEGRITY

Students are expected to familiarize themselves with, and fully understand the policy on plagiarism and academic honesty at the University of Manitoba. This policy is described in detail in the section **Academic Integrity** in the online **University of Manitoba Undergraduate Academic Calendar 2016-2017:**

- (a) Plagiarism – the presentation or use of information, ideas, images, sentences, findings, etc. as one’s own without appropriate citation in a written assignment, test or final examination.
- (b) Cheating on Quizzes, Tests, or Final Examinations – the circumventing of fair testing procedures or contravention of exam regulations. Such acts may be premeditated/planned or may be unintentional or opportunistic.
- (c) Inappropriate Collaboration – when a student and any other person work together on assignments, projects, tests, labs or other work unless authorized by the course instructor.
- (d) Duplicate Submission – cheating where a student submits a paper/ assignment/test in full or in part, for more than one course without the permission of the course instructor.
- (e) Personation – writing an assignment, lab, test, or examination for another student, or the unauthorized use of another person’s signature or identification in order to impersonate someone else. Personation includes both the personator and the person initiating the personation.
- (f) Academic Fraud – falsification of data or official documents as well as the falsification of medical or compassionate circumstances/ documentation to gain accommodations to complete assignments, tests or examinations.

RECIPROCAL EXPECTATIONS AT THE UNIVERSITY OF MANITOBA

Students will be treated respectfully and fairly **by myself** in class and outside of class. Students are expected to treat faculty and fellow-students in a respectful manner. During lectures, talking to classmates, eating, texting, leaving the lecture before the end unless this is unavoidable (illness, washroom needs) is disruptive and distracting to me and to your fellow-classmates, and such practices are unacceptable.

Attendance for all lectures is required, although I do not take attendance. Since the tests are based on material covered in lectures, absenteeism will be quite detrimental to a student's grade in the course.

The code of conduct at the University of Manitoba requires a respectful learning environment in which bullying, threats, physical violence, harassment—sexual or other varieties, are strictly prohibited. Refer to the following link regarding the University of Manitoba policy on a “Respectful Work and Learning Environment”:
http://umanitoba.ca/admin/governance/governing_documents/community/230.html

ACCEPTABLE GROUNDS FOR NOT WRITING A SCHEDULED TEST

The **only** acceptable grounds for not writing a scheduled are (i) medical, for which a note from a doctor is required, and (ii) compassionate, where the reasonable judgement of the instructor will be exercised. If a test is missed on acceptable grounds, then either a make-up test will be scheduled or the prorating of other test grades will be done, at the discretion of the instructor. If a student misses a test for an unacceptable reason, the grade assigned for that test will be zero.

There will be no lectures on the following days: Friday, **October 7** and Monday **October 10** (during the **October 6-10 Fall Term Break**), and Friday, **November 11 (Remembrance Day)**

DEADLINES

Monday, September 19, 2016 is the deadline to revise Fall Term registration. After that date, students are ineligible for any tuition fee refund.

Friday, November 18, 2016 is the last date to voluntarily withdraw from Fall Term courses without academic penalty.

Schedule A:

Academic supports available to students:

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.

Schedule B:

Health-related supports available for students:

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

Student Accessibility Services (SAS)

SAS can be reached at 204-4747423, 520 University Centre, or by email at

<http://umanitoba.ca/student/saa/accessibility/>

The services of SAS are for students with a disability—(e.g. mental illness, learning, medical, hearing, visual, and injury-related)--who require academic accommodation supports and services such as note-taking, interpreting, assistive technology and exam accommodations.

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

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>

Schedule C:

Copyright information

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:

A statement directing the student to University and Unit policies, procedures, and supplemental information available on-line:

Students' 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) <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

Student Discipline

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

- 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
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

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/>

You can contact an **Academic Advisor** for questions about your academic program and regulations <http://umanitoba.ca/academic-advisors/>

You can 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