湖北工業大學
HUBEI UNIVERSITY OF TECHNOLOGY

Course Title	Game Theory
Course Code	MATH 3850
Semester	Summer 2025
Course Length	10 weeks, 60 Contact Hours
Credits	4
Instructor	TBA
Office	TBA
Email	TBA
Prerequisite	Calculus II, Introduction to Probability

Course Description:
Game theory is used in various fields, such as economics, biology, business, law, politics, sociology, and computer science. This course introduces the core theories and concepts of game theory with a focus on economic applications to undergraduate students in various disciplines. Topics include rationalizability, Nash equilibrium, mixed strategies, sub-game perfection, repeated games, etc. The course will deal with the solution concepts for normal form and extensive form games along with a variety of applications.

Course Goals:

Students who successfully complete this course will demonstrate competency in the following general education core goals:

- **Critical Thinking Skills** – Students will engage in analytical thinking, demonstrating the ability to critically evaluate, synthesize, and apply knowledge to complex problems, and construct well-reasoned solutions and arguments.
- **Independent Research and Inquiry** – Students will conduct independent research, utilizing academic resources to explore relevant topics, formulating research questions, analyzing data, and presenting findings in a coherent, scholarly manner.
- **Problem-Solving and Application** – Students will apply theoretical concepts and methodologies learned in the course to real-world problems, demonstrating the ability to develop practical solutions informed by academic inquiry.
- **Global and Cultural Awareness** – Students will gain awareness of the global and cultural contexts relevant to the course, appreciating diverse perspectives and considering the implications of their studies in a broader, international context.

Student Learning Outcomes:

Upon completion of this course, students will be able to:

- explain the basic concepts of game theory;
- model real-world problems as games and multi-agent simulation models;
- solve simple game problems in a real-world scenario with game theory.

Textbooks/Supplies/Materials/Equipment/ Technology or Technical Requirements:
Martin J. Osborne. *An introduction to Game Theory*, Oxford University Press, 2004.

Course Requirements:

Class Attendance
Full credit for attendance will be given to students with three or fewer unexcused absences. Four or more absences will result in a proportional reduction of the grade.

Participation
Participating means asking questions if something is unclear, venturing answers to questions put to the class, and participating in the polls and games administered during class.

Problem Sets
Problem sets will be assigned throughout the semester. Solutions for the problems will be provided after they are submitted.

Exams
The midterm exam covers all the material from lectures and the problem sets prior to the date of the exam. The final exam is cumulative and tests all material covered in lectures and the problem sets during the quarter.

Assessments: Activity	**Percent Contribution**
Class Attendance	5%
Participation	10%
Problem Sets	25%
Midterm Exam	25%
Final Exam	35%

Grading:

Final grades will be based on the sum of all possible course points as noted above.

Grade	**Percentage of available points**
A	94-100
A-	90-93
B+	87-89
B	84-86
B-	80-83
C+	77-79
C	74-76
C-	70-73
D	64-69
D-	60-63
F	0-59

Course Schedule:
The schedule of activities is subject to change at the reasonable discretion of the instructor. Minor changes will be announced in class, major ones provided in writing.

MATH 3850 Schedule		
Lecture	Topic	Reading Sections
L1	Introduction	1.1-1.3
L2	Strategic Games	2.1
L3	The Prisoner's Dilemma and other examples	2.2-2.5
L4	Nash Equilibrium Examples of Nash equilibrium	2.6-2.7
L5	Dominated Actions Equilibrium in a single population: symmetric games and symmetric equilibria	2.8-2.10
L6	Cournot, Bertrand, Electoral Competition	3.1-3.3
L7	Auctions	3.4-3.6
L8	Introduction to Mixed Strategy Equilibrium	4.1-4.2
L9	Mixed strategy Nash equilibrium	4.3
L10	Strict Domination for Mixed Strategies	4.4
L11	Illustrations of Mixed Strategy Equilibrium: expert diagnosis Illustration: reporting a crime	4.6-4.8
L12	Extensive Games with Perfect Information: Theory	5.1-5.2
L13	**Midterm Exam**	--
L14	Strategies and Outcomes in Extensive Games	5.3
L15	Nash Equilibria of Extensive Games	5.4
L16	Subgame Perfect Equilibrium	5.5
L17	Extensive Games with Perfect Information: Illustrations Nash Equilibria of the Ultimatum game	6.1-6.2
L18	Coalitional Games and the Core	8.1-8.2
L19	Bayesian Games	9.1-9.4
L20	Evolutionary Equilibrium Evolutionary game theory	13.1-13.2
L21	Asymmetric Equilibria	13.3-13.4
L22	Repeated Games: The Prisoner's Dilemma Infinitely Repeated Games	14.1-14.3
L23	Some Nash equilibria of the infinitely repeated Prisoner's Dilemma Subgame perfect equilibria	14.4-14.7
L24	Bargaining Repeated Ultimatum Game Holdup Game	16.1-16.3
L25	**Final Exam**	--

Accommodation Statement:

Academic accommodations may be made for any student who notifies the instructor of the need for an accommodation. It is imperative that you take the initiative to bring such needs to the instructor's attention, as he/she is not legally permitted to inquire. Students who may require assistance in emergency evacuations should contact the instructor regarding the most appropriate procedures to follow.

Academic Integrity Statement

Each student is expected to maintain the highest standards of honesty and integrity in academic and professional matters. The University reserves the right to take disciplinary action, up to and including dismissal, against any student who is found guilty of academic dishonesty or otherwise fails to meet the standards. Any student judged to have engaged in academic dishonesty in coursework may receive a reduced or failing grade for the work in question and/or for the course.

Academic dishonesty includes, but is not limited to, dishonesty in quizzes, tests, or assignments; claiming credit for work not done or done by others; hindering the academic work of other students; misrepresenting academic or professional qualifications within or without the University; and nondisclosure or misrepresentation in filling out applications or other University records.

Other Items:

Attendance and Expectations

All students are required to attend every class, except in cases of illness, serious family concerns, or other major problems. We expect that students will arrive on time, be prepared to listen and participate as appropriate, and stay for the duration of a meeting rather than drift in or out casually. In short, we anticipate that students will show professors and fellow students maximum consideration by minimizing the disturbances that cause interruptions in the learning process. This means that punctuality is a must, that cellular phones be turned off, and that courtesy is the guiding principle in all exchanges among students and faculty. You will be responsible for the materials and ideas presented in the lecture.

Assignment Due Dates

All written assignments must be turned in at the time specified. Late assignments will not be accepted unless prior information has been obtained from the instructor. If you believe you have extenuating circumstances, please contact the instructor as soon as possible.

Make-Up Work

The instructor will not provide students with class information or make-up assignments/quizzes/exams missed due to an unexcused absence. Absences will be excused and assignments/quizzes/exams may be made up only with written documentation of an authorized absence. Every effort should be made to avoid scheduling appointments during class. An excused student is responsible for requesting any missed information from the instructor and setting up any necessary appointments outside of class.

Access, Special Needs, and Disabilities

Please notify the instructor at the start of the semester if you have any documented disabilities, a medical issue, or any special circumstances that require attention, and the school will be happy to assist.