

# ECO 355 / AMS 355 - GAME THEORY

Winter 2017

Department of Economics  
Stony Brook University

**Course code and section:** ECO 355 - section 01

**Credit hours:** 3 credit hours

**Instructor:** Tilsa Ore-Monago

**Office hours:** Available online on M., W. & F. 4:00pm-5:30pm (EST).  
Asynchronous through discussion forums in Blackboard.

**E-mail:** [tilsa.oremonago@stonybrook.edu](mailto:tilsa.oremonago@stonybrook.edu)

## Course description

Game Theory helps us to understand how people(agents) take decision when interact with others, it analyze situations in which payoffs to agents depend on the behavior of other agents. It involves the analysis of competition and cooperation. This course offers an introduction to basic game theory concepts and applications, and mainly focuses on non-cooperative games. The topics covered include strategic games and Nash equilibrium, extensive games, dynamic games, and subgame perfection.

Although many relates Game theory applications to economics, its applications expands to politics, law, biology, and computer science. As an introductory course, this course will provide you with basic tools to solve a game and to predict its rational outcomes; for that purpose I will mainly use examples from business and economics.

This course has 3 credits and is offered as both AMS 335 and ECO 355.

## Course objectives

The main goal of the course is to provide students with basic knowledge of Game Theory to understand and analyze economic, social and also political issues.

At the end of this course, the student is expected to understand and be able to apply Game theoretical analysis in problems, to comfortably set those problems in strategic or extensive form games, and find equilibria.

## Course requirements

MAT 126 or 131 or 141 or AMS 151; C or higher in ECO 303.

## Course material

- Gibbons, R., "Game Theory for Applied Economists", Princeton University Press, 1992. [Required]
- Tauman, Y., "Game Theory", Lecture slides, Stony Brook University. [Required, material provided in Blackboard]

Other highly recommended material includes:

- Maschler, M., Solan E. and Zamir, S., "Game Theory", Cambridge University press, 2013.
- Osborne, M. "An introduction to Game Theory", Oxford University Press, 2003.

**Any supplemental material will be posted in Blackboard.**

## Course Format

### Statement about course delivery/modality

This is an asynchronous online course, delivered in the Blackboard learning management system (LMS). That means that there will be no required real time interaction.

You will use your NetID account to login to the course from the Blackboard login page (<http://blackboard.stonybrook.edu>). In Blackboard, you will access to all online lessons, course materials, and resources. At designated times throughout the semester, we will participate in a blend of self-paced and group-paced activities using Blackboard and alternative Internet-based technologies. [See "Technical Requirements" section for more information.]. Activities will consist of chat, blogs, discussion forums, and email.

Students must be mindful of all course expectations, deliverables and due dates (here is a quick readiness quiz you can take to determine if you are ready for online courses <http://commons.suny.edu/assessment/quick-readiness-quiz/>).

In case you face difficulties to access Blackboard, or have any technical issue, please send an email to [blackboard@stonybrook.edu](mailto:blackboard@stonybrook.edu), they can also be reached by telephone at 632-2777. You should also copy me on this email so that I am aware of the situation and if possible include a screen-shot of the issue. In any case, you can find the materials in my web page (<http://www.ic.sunysb.edu/Stu/toremonago/>) and, once reported your technical problem via email, you can submit the test's answers to my email [tilsa.oremonago@stonybrook.edu](mailto:tilsa.oremonago@stonybrook.edu)

During this course, I expect you to follow all the online lectures, and complete the weekly quizzes and homework assignments related to each topic discussed during each week. **This course requires you to spend time preparing and completing assignments. I also expect you to actively participate of the forums. As an online student you should commit 10-15 hours per week to each of your online courses.** Please see <http://www.stonybrook.edu/spd/online/faqs.html>.

## Preferred Method of Contact with Instructor

Any question related to the material or session, please submit it in the **Discussion Forum** corresponding to each module.

I prefer you to **contact me via email** (at [tilsa.oremonago@stonybrook.edu](mailto:tilsa.oremonago@stonybrook.edu)) **to discuss personal issues ONLY**, which you cannot discuss in the discussion forum. I will answer to your emails as soon as possible, but please allow between 24-48 hours for a response. Please utilize your Stony Brook University email when getting in touch with me as that is the preferred method of contact from the institution.

## Assessment

- Quizzes 30%
- Problem Sets 50%
- Final (Sat, Jan 21) 20%

You will be able to keep track on your course progress of graded activities by checking 'My Grades' on Blackboard.

I will update the online grades each time a grading session has been complete – typically 2 days following the completion of an activity. You will see a visual indication of new grades posted on your Blackboard home page under the link to this course.

## Quizzes

The course requires you to read and fully understand the material. You will be given **6 quizzes** (two per week) that will be design to help you with the revision and understanding of key concepts.

Your quizzes must be submitted via Blackboard, unless otherwise announced by the instructor, and will be **due at 11:59 pm. (midnight) in Eastern Standard Time (EST) of the given deadlines** shown in Table 2. Only **the best 5 will account for your grade**.

## Discussion forums

We will have discussion forums open through Blackboard every week for you to post questions or doubts. Every student is encouraged to participate either asking questions or replying to another student's question.

The forums are open spaces to ask questions and will be the quickest way to get answers. The participation to the discussion forums will not be formally graded, but it will make a difference for your better understanding of the topics.

## Problem Sets

There will be **3 Problem sets (PS)** posted in blackboard at the beginning of the Online course. These PS will consist on mainly, but not restricted to, multiple choice questions about solving games and problems presented and discussed during the online sessions.

- All PS, unless otherwise announced by the instructor, **MUST** be submitted via Blackboard.
- PS's submissions will be **due at 11:59 pm. (midnight) EST of the given dates** shown in Table 2.
- You will be allowed to have **up to two attempts** for PS submission before the deadline. If you attempted once, and the deadlines passed, you will not be able to use your second chance.
- **Under no circumstances will late PS be accepted.** Missed PS deadlines cannot be made up.
- **ALL PS** you submit will account for your grade.

### Exam

There will be **onely ONE exam**, the **FINAL EXAM**, which will be **due by midnight (11:59 pm EST) of Saturday January 21st**.

- The final exam will test the topics discussed during all the winter session. It will consist mostly on multiple choice questions and it may include short answer questions.
- The final exam will be timed. Unlike PS, once submitted you will not be able to change your answers in the exam.
- **There will be no make-up exam if you missed the deadline.**

**IMPORTANT:** If at any point you should encounter any technical issues, please send an email to [blackboard@stonybrook.edu](mailto:blackboard@stonybrook.edu), they can also be reached by telephone at 632-2777. You should also copy me on this email so that I am aware of the situation and if possible include a screen-shot of the issue.

### Grades and grading scale

Letter grades assigned for this course will be based on the percentage of total points earned (see Table 1). All course requirements must be completed before a grade is assigned.

Table 1: Letter Grade Assignment

Letter Grade	Percentage	Performance
A	91-100%	Excellent
A-	86-90%	Very Good
B+	83-85%	Good
B	79-82%	Mostly Good
B-	76-78%	Above Average
C+	73-75%	Average
C	67-72%	Mostly Average
C-	61-66%	Below Average
F	0-60%	Failed

## **Academic Policies**

### **Academic integrity**

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspect instances of academic dishonesty to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at <http://www.stonybrook.edu.uaa.academicjudiciary/>.

### **Critical Incident Management**

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn.

**University Student Conduct Code** can be found at <http://studentaffairs.stonybrook.edu/ucs/docs/universitystudentconductcode.pdf>.

### **ADA and Disability Support Services (DSS) Statement**

The Rehabilitation Act of 1973 – Section 504 applies to all postsecondary educational programs that receive federal assistance. Reasonable accommodations and academic assistance are provided to students with disabilities registered with the Disability Support Services, ECC (Educational Communications Center) Building, Room 128, (631) 632-6748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential. For procedures and information go to the following website: <http://www.stonybrook.edu/ehs/fire/disabilities>.

### **Course Materials and Copyright Statement**

Course material accessed from Blackboard, SB Connect, SB Capture or a Stony Brook Course website is for the exclusive use of students who are currently enrolled in the course. Content from these systems cannot be reused or distributed without written permission of the instructor and/or the copyright holder. Duplication of materials protected by copyright, without permission of the copyright holder is a violation of the Federal copyright law, as well as a violation of Stony Brook's Academic Integrity and Student Conduct Codes.

## **Communication Competency**

You convey a certain image of yourself every time you express yourself-whether it's through the written or spoken word. As such, successful professionals (students, managers, employees) must have effective written and oral communication skills. Therefore, communication errors (such as improper grammar, improper sentence and paragraph structure, misspelling and incorrect punctuation) are unacceptable in coursework throughout. Faculty members also consider communication competency when evaluating student performance in addition to coursework.

## Email and Internet

You must have an active Stony Brook University e-mail account and access to the Internet. All instructor correspondence will be sent to your SBU e-mail account. Please plan on checking your SBU email account regularly for course related messages.

## Net-Etiquette Guidelines

The following guidelines for participation in the Threaded Discussion Area and Chat rooms.

- Remember that the absence of face-to-face communication it's easy to misunderstand what is being said;
- Carefully review and read materials that you receive electronically to ensure that you fully understand the message;
- Be sure to carefully re-read and understand what you will be sending in order to ensure that you are not misunderstood by anyone;
- Avoid cluttering your messages with excessive emphasis (stars, arrows, exclamations);
- If you are responding to a message, either include the relevant part of the original message in your message, or make sure refer to the original's contents so as to avoid confusion;
- Be specific and clear, especially when asking questions;
- If your messages are typed in UPPER and lower case, please use the two appropriately instead of all UPPERCASE characters. This gives the appearance of shouting and makes the message less readable;
- Remember that not all readers have English as their native language, so make allowance for possible misunderstandings and unintended discourtesies;
- Do not abuse new users of computer networks for their lack of knowledge;
- Follow the same standards of politeness as you do in any other aspect of your life.

## Technical Requirements

This course requires that you have access to the Internet. You are responsible for having a reliable computer and internet connection throughout the course. You will need to have access to, and be able to use the following software packages

- A web browser (for instance, Google Chrome, Mozilla Firefox or Internet Explorer)
- Adobe Acrobat Reader (free)
- Adobe Flash Player (free)
- Microsoft Word, PowerPoint and Excel (free to Stony Brook University students, go to <https://it.stonybrook.edu/software/title/microsoft-office>)

*Please note! You will be limited if you expect to complete your work on a smart phone or tablet. It will not be possible to submit the Microsoft Word files required for your homework assignments.*

## Getting Technical Help

### Campus Network or Blackboard Outage

When access to Blackboard is not available for an extended period of time (greater than one entire evening - 6pm till 11pm) you can reasonably expect that the due date for assignments will be changed to the next day (assignment still due by midnight).

### Help-Desk

Go to the menu item “SPD Online Support” and go to the Discussion Board within the support site. There you will find a Technical Questions and Answers Forum. Post your question there, and someone from the SPD Online office will respond. Alternatively, you could call the SPD Online office at (631) 632-9484 between the hours of 9:00am and 5:00pm, Monday through Friday or email [spd\\_online@stonybrook.edu](mailto:spd_online@stonybrook.edu).

For assistance after 5 PM or over the weekend, please contact the Open SUNY Technical Support, information can be found at [urlhttp://open.suny.edu/support/contact-us/current-students/](http://open.suny.edu/support/contact-us/current-students/)

### Getting Help with Bb Learning Management System (LMS)

First contact SPD Online at [spd\\_online@stonybrook.edu](mailto:spd_online@stonybrook.edu) or (631) 632-9484. After hours contact Open SUNY Technical Support, see above for contact information.

Additionally students that need help with Bb can contact the TLT Student Help Desk by calling (631) 632-9602, emailing [helpme@stonybrook.edu](mailto:helpme@stonybrook.edu); more information is available via Stony Brook IT: <http://it.stonybrook.edu/services/blackboard#section-6706>  
Frequently ask questions about the Bb LMS along with tutorials are available here: <http://it.stonybrook.edu/services/blackboard/navigate-manage>

## Academic Support

- SPD Subject Guides - The SPD Subject Guide is a library website specifically designed to assist SPD students with their research. It contains all of the information referenced on this Blackboard page as well as recommendations for specific databases and a live librarian chat feature. Take a look: <http://guides.library.stonybrook.edu/spd>
- Student Support for Online Learning - <http://www.stonybrook.edu/commcms/onlineed/student.html>
- SBU Library Research Guides and Tutorials <http://library.stonybrook.edu/research/research-basics/>
- Library Instruction Website -  
<http://library.stonybrook.edu/workshops-this-week-citation-skills-worldcat-and-endnote-the-hsc/>

## Subject to Change Notice

All material, assignments, and deadlines are subject to change with prior notice. It is your responsibility to stay in touch with your instructor, review the course site regularly, or communicate with other students, to adjust as needed if assignments or due dates change

## Syllabus Disclaimer

The instructor views the course syllabus as an educational contract between the instructor and students. Every effort will be made to avoid changing the course schedule but the possibility exists that unforeseen events will make syllabus changes necessary. The instructor reserves the right to make changes to the syllabus as deemed necessary. Students will be notified in a timely manner of any syllabus changes via email or in the course site Announcements. Please remember to check your SBU email and Blackboard Announcements often.

## Course structure

### Module 1: Strategic (or Normal) Form Games I

Formal definition, Iterated elimination of dominated strategies, Nash Equilibrium definition, Nash Equilibrium applications (Cournot and Bertrand models) (G. Ch. 1.1A -1.1C, 1.2)

Network design and Braess paradox (T. Lecture slides)

### Module 2: Strategic Form Games II

MinMax and MaxMin strategies, Two-person zero sum game, value of a game. (T, Lecture slides)

Mixed Strategies: definition, and definition of Nash Equilibrium in Mixed Strategies (G. Ch. 1.3A - 1.3B)

### Module 3: Extensive (or Tree) Form Games I

Analysis of extensive form games, Normal form representation of extensive form game, Dynamic games with complete information, Definition of Nash Equilibrium for extensive form games, Subgame perfection, backward induction, applications (G. Ch. 2.1A-2.1C, 2.2A-2.2C)

Dynamic games with complete but imperfect information (G. 2.4)

### Module 4: Extensive Form Games II

Games with incomplete information: Bayes-Nash equilibrium, applications. (G. Ch. 3.1 -3.2)

*This module may not be fully evaluated, but material will be provided for your self-study.*



Table 2: Class Schedule Winter 2017

Week: Modules	Topics	PS/Quiz deadline
1 : M1	Formal definition Iterated elimination of dominated strategies Nash Equilibrium definition, Applications Network design and Braess paradox	Q1: Jan 04 Q2: Jan 07 PS1: Jan 08
2 : M2-M3	MinMax and MaxMin strategies Two-person zero sum game, value of a game Mixed Strategies Analysis of extensive form games Normal form representation of extensive form game	Q3: Jan 10 Q4: Jan 12 PS2: Jan 13
3 : M3-M4	Dynamic games with complete information Nash Equilibrium for extensive form games Subgame perfection Backward induction, Applications Games with incomplete information	Q5: Jan 17 Q6: Jan 20 PS3: Jan 19
<b>Final exam</b>		<b>Exam: Jan 21</b>