**Game Assignment for Environmental Economics**

This is a group assignment for Environmental Economics at the undergraduate level that could replace a course paper assignment.

Objectives: At the end of this assignment students will understand economics, environment and geosciences at a deep level and learn how to differentiate theoretical results from real situations; gain excel skills, team working skills and game creation skills that are useful in their working environments; reinforce their writing and presentation skills; and finally learn the subject by doing it and having fun.

The assignment consists of six separate sections:

1. **Abstract**

In a paragraph explain the game, its logic and the concepts that will be illustrated.

1. **Instructions**

These instructions should be passed to the players and should be easy to understand. It should be no longer than 2 pages and should include:

* Description of the Game and Motivation - What type of game is this? What do you want to show with this game? What are the players? The game should demonstrate a result or results based on 3 economics/environment/geosciences concepts (competing forces).
* Game Environment - Maps or representation of the physical environment in which the game is played; restrictions or resources available in the form of competing forces; non-player characters that influence the evolution of the game but does not depend on the players.
* Game Rules - Make sure rules represent concepts, relationships, and interactions that are found in the lectures and readings of the microeconomics class.
* Procedures and Payoffs - Completed narrative on flow of the game and order of player actions; payoffs or results after each run.
* Winners/Losers - Make sure to establish methods for scoring/winning/starting & ending the game.
* Players, Goals and Strategies - Number of players, initial resources available to them, player objectives and all strategies available to them.
1. **Game Board and Excel Engine**

The game board can be powerpoint or excel based. The engine is a spreadsheet that runs in the background and calculates payoffs and results. Explain the logic of the game board, how the engine works, what it calculates and how it connects to the game board. The instructor will assist with the spreadsheet if necessary and models are provided in the examples from the Nov class and the online support given by the catalyst web site. The real engine should be incorporated as a separate excel file, and key pictures of the game board and engine can be included in the Appendix section.

1. **Economics, Environment and Geosciences Debriefing Section**

This is the section that shows your deep understanding of the subjects learned. It contains the expected results of the game based on the two big results mentioned in the Description of the Game and Motivation. It should contain also a question for the players about how the ‘real’ game differs from the theoretical result, and how they would explain it. It should not be longer than 2 pages.

1. **References**

Include all references used in the assignment.

1. **Appendix**

Include pictures of the game board and engine with key values and graphs that illustrate the game.

**Note about style and format:**

* We will use APA style because it is the style at SOBM. More information is at our Library, <http://nuls.nu.edu/web/trainingtools/assets/media/APA.pdf> or <http://library.nu.edu/FindResources/ReferenceTools/citations.html>. Follow APA format for margins, titles, subtitles, quotations, footnotes, and references. Avoid using quotation marks with the ideas of others. Write the ideas of others with your own words and properly acknowledge the source of it.
* Use font Times New Roman, size 11-12 and double space.
* When ready submit your assignment as a word or pdf document using the dropbox.
* Short papers are nice pieces of art. If you need help with the writing and style, contact the Writing Center. The email contact is writing@nu.edu, or you can ask for the closest Writing Center to you by calling 1-866-NU-ACCESS.

**Theoretical Concepts that Can be Included in Your Game**

The course learning outcomes in this class are:

1. Recognize and analyze the relationship between market activity and the environment using marginal benefit-cost analysis, especially for air, water and waste related cases.
2. Apply theories of market equilibrium and failures, price determination and externalities, private and public goods and cost analysis to assess environmental problems.
3. Apply market and regulatory models, as well as instruments based on allocative efficiency and cost effectiveness to evaluate private and public solutions to environmental problems.
4. Understand and apply benefit-cost analysis, contingent valuation and averting expenditure methods to evaluate risk assessment and risk management when dealing with environmental problems.
5. Understand long term relationships between economic growth and quality environment, environment, pollution prevention and international environmental problems.
6. Identify the main environmental problems in their own communities and propose possible solutions based on economic theories and instruments learned in this course.

The key economics, environment and geosciences concepts that support those learning outcomes and that you should incorporate in your game assignment are the following:

* Benefit-Cost Marginal Analysis
* Market Equilibrium
* Optimum Allocation of Resources
* Market Failure
* Externalities
* Private Goods and Public Goods
* Private and Social Costs
* Price Elasticity
* Opportunity Cost, explicit costs, implicit costs, sunk costs
* Profit maximization, marginal cost = marginal benefit
* Perfect Competitive Markets
* Non-Competitive Markets or Oligopoly, Monopoly, Monopolistic Competition
* Rent Seeking and the Problem of the Commons
* Property Rights
* Pollution Tax and Pollution Permit Markets
* Contingent Valuation
* Risk Assessment and Risk Management
* Optimum Allocation of Resources

**Online Support to Design your Game**

A group of faculty at the School of Engineering (SETM) has created a web site with useful documents for students. The web site is **nucatalyst.com** and the faculty that developed all the videos is James Jaurez.

Register at **nucatalyst.com** and don’t forget to remember your username and pswd. Once you register, go to User Menu 🡺 Available Courses 🡺 Game Design for All 🡺 Go to Course

In the ‘Game Design for All’ course there are 4 sections:

Section 1, *Learning Game Design Through Play*, introduces a battle game with 3 short videos. It has a dice roller you can use for your games at <http://www.wizards.com/dnd/dice/dice.htm>

Section 2, *Defining Characters, Procedures and Objectives for the Game*, presents the basic concepts and tools necessary for you to create your own game with 4 short videos: Competing Forces, Build and Balance, Building Maps and Assets, Student Demonstration of a Game Project.

Section 3, *Defining Characters, Procedures and Objectives for the Game*, contains 1 short video called Mapping to Game Rules. This is important to design your game engine and connect this engine to the game itself. Notice there is a spreadsheet with Demand data you can download.

Section 4, Presenting and Playing the Game, has nothing yet. However, you can go to the Events section and look for the San Jose State Visit, Nov 17-18, 2011 (<http://nucatalyst.com/events/69-san-jose-state-visit> ). There you will find presentations of games developed by graduate and undergraduate students, including the one from ECO203. Notice that this presentation was on Nov 17, students did not have a final product yet.

**Suggested Steps and Time Table**

By the End of Week 1: groups formed and basic agreement

By the End of Week 2: general description

By the End of Week 3: game board and engine

By the End of Week: final assignment