



## CALCULUS

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### PROGRAM

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The tentative program is planned on 12 weeks (since we have to take into account holidays and exam periods):

#### Topic 1. INTRODUCTION TO CALCULUS (1 week)

- Properties of the absolute value
- Radicals
- Functions
- Multiplication / Division of polynomials
- Factoring
- Solving equations and systems
- Solving inequalities
- Trigonometrics: important values on the unit-circle
- Solving trig equations
- Basic review: exponential and logarithm

#### Topic 2. LIMITS AND CONTINUITY (3 weeks)

- Introduction to the limits: informal definition of the limit
- Cases of non-existence of the limit
  - Different behavior from the left and right-hand side of the point
  - Infinite values
  - Oscillation
- Formal definition of the limit
- One-sided limits
- Infinite limits
- Vertical asymptotes
- Properties of the limits
- Limit of a composite function
- Limits of the trigonometric functions
- Strategies for the computation of limits
  - Functions coinciding in all points except one
  - Sandwich theorem
  - Two special limits
- Calculating the limit of a piecewise function
- Indeterminate forms:  $k/0$ ,  $\infty/\infty$ ,  $\infty-\infty$ ,  $0/0$ ,  $0\cdot\infty$ ,  $1^\infty$
- Definition of continuity
- Two types of discontinuity: removable and non-removable
- Properties of the continuity
- Intermediate value theorem



Topic 3. DERIVATIVES: CONCEPT AND COMPUTATION (2 weeks)

- The tangent line problem
- Derivation, definition
- Lateral derivatives
- Differentiability and Continuity
- Derivative rules
- Chain rule
- Higher order derivatives
- Derivatives of inverse functions
- Implicit differentiation
- Differentials. Linear approximations.
- L'Hopital rule

Topic 4. STUDY AND GRAPHICAL REPRESENTATION OF A FUNCTION (1 week)

- Domain of the function
- Symmetry
- Periodicity
- Intersections with the x-axis and y-axis
- Asymptotes
- Parabolic branches
- Increase and decrease
- Maxima and minima
- Concavity and convexity
- Inflection points

Topic 5. INTEGRATION (3 weeks)

- Concept, Indefinite integral
- Properties of the indefinite integral
- Fundamental formulas of integration
- Integration by parts
- Integration of rational functions
- Integration of trigonometric functions
- Integration by substitution or change of variable
- Approximation of the area of a two-dimensional region
- Definition of the definite integral
- Properties of the definite integral
- Fundamental theorem of calculus (the Barrow's rule)
- Integral defined as a function
- The second fundamental theorem of calculus
- Improper integrals
- Improper integrals with infinite discontinuities
- Integration of even and odd functions
- Area between a function and the x-axis



- Area between two functions
- Average function value theorem (mean value theorem)

## Topic 6. SEQUENCES AND SERIES (2 weeks)

### Sequences

- Pattern recognition
- Operations with sequences
- Limit of a sequence
- Properties of limits of sequences
- Squeeze (the sandwich) theorem for sequences
- Bounded monotone sequences

### Infinite series and partial sums

- Definition of a convergent and divergent series
- Geometric series
- Properties of infinite series
- The n-th term divergence test
- The integral test
- The p-series and harmonic series
- The comparison test
- The limit comparison test
- The alternating series test
- Absolute and conditional convergence
- The ratio test
- The root test
- Strategy to analyze convergence of a series
- Summary n convergence

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## COURSE MATERIALS

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- Your class notes.
- <http://www.vitutor.com/> in English and Spanish
- [http://tutor-homework.com/Math\\_Help/Calculus.html](http://tutor-homework.com/Math_Help/Calculus.html) in English
- Free lecture notes provided by Paul Dawkins. I *strongly* advise you to get the notes.
- The textbook 'Calculus' (8th ed., McGraw-Hill) by Larson, Hostetler and Edwards is available both in English and Spanish.
- Every week-end, I will put on ADI a PDF file corresponding to the program of the following week. Get it!
- Before starting new topic, I will upload to the site a list of typical problems on the topic. I *strongly* recommend you to solve these problems!
- For some topics (or parts of a topic) I will provide you additional notes. You will be able to get them together with the program of the week.



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## EVALUATION

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The final grade of the course is counted as weighted average of the following grades:

1. Continuous evaluation (15%). Two 30 minutes mini-exams after each third topic the typical problems (see Materials).
2. Mid-term exam (25%)
3. Final exam (60%)

\* If the grade of the final exam is higher than one computed by weighted average, I will take into account the grade of the final exam only.



## INTRODUCTION TO MICROECONOMICS

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### COURSE GOALS

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This course represents the basic knowledge for subsequent study of microeconomic theory. Aside from being the first contact that you will have with economic theory, this course is quite extensive. The agenda is general enough and we will complement the topics in the book with readings taken from other sources that will be posted on the webpage during the course.

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### SYLLABUS

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#### Part I: Introduction:

1. 7 Principles of Economics (CAP 1 MAN).
2. How do economists think? (CAP 2 MAN):
  - Microeconomics and macroeconomics.
  - Models and assumptions.
3. Some mathematical concepts.

#### Part II. Supply and Demand: How Markets Behave:

4. Supply and Demand (CAP 4 MAN):
  - Markets and Competition.
  - Demand.
  - Supply.
  - Market Equilibrium.
5. Elasticity (CAP 5 MAN):
  - Elasticity of Demand.
  - Elasticity of Supply.
  - Examples.
6. Supply, Demand and public policies (CAP 6 MAN):
  - Price Controls.
  - Taxes.
7. Markets and Economic Welfare (CAP 7 MAN):
  - Consumer and Producer Surplus.
  - Efficiency of the market.

#### Part III. Analysis of the Demand:

8. The Theory of Consumer Choice (CAP 21 MAN):
  - Budget constraints, preferences and optimization.
  - Individual Demand and market demand.



#### Part IV. Analysis of Supply:

9. The Costs of Production (CAP 13 MAN):
  - Costs: Concept and types of cost.
  - The Short and long run.
10. Perfect competition (CAP 14 MAN):
  - Profit Maximization in competitive markets.
  - Market Supply.
11. Monopoly (CAP 15 MAN):
  - What they are and why they appear.
  - Production and Price decisions.
  - Social costs with a monopoly.
  - Price discrimination.
12. Oligopoly and Monopolistic Competition (CAP 16 & 17 MAN):
  - What are oligopolies?.
  - Examples and public policies.
  - Monopolistic Competition.

#### Part V. Other applications of the theory of markets:

13. Markets of Production factors (CAP 18 MAN):
  - Supply and Demand of Labor.
  - Other factors of Production.
14. Market Failures (CAP 10 & 11 MAN):
  - Externalities.
  - Public Goods and common resources.

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#### COURSE GRADING:

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You will be evaluated throughout the semester on your class attendance and in class participation. There will be a blackboard session with the TA each two weeks (seven blackboard sessions in total). At each of these sessions you must turn in your answers to the questions proposed as homework in the previous session. These questions will be discussed during the blackboard session. If you fail to hand in three or more homework you will lose the corresponding 20% of your final grade. Not all homework will be graded: Three of the problem sets will be chosen for correction. Your failing to turn in one of the graded problem sets will mean that you lose the points assigned to it. Your final grade will consist of the midterm exam (20%), the final exam (60%) and the homework (20%). There will be two exams: One midterm exam (not optional), in December, and a final exam in January/February. The structure of both exams will be identical and will consist of the following three sections: vocabulary concepts, theoretical questions (65%), and problems (35%). If you do not answer 15 of the 20 concepts correctly you will fail the exam. Those of you that have already taken this class and failed have the option to only base your course grade only on the final exam. That means that your problem sets will not be checked or graded and you do not have to take the



midterm: The final exam will determine the 100% of your grade. You have to notify me of your choice of grading system before the third week of the term.

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TEXTBOOK

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Mankiw, G. (2004): Principles of Economics, 3rd edition. Thomson-Southwestern.



## FUNDAMENTALS OF PRODUCTION AND THE ORGANIZATION

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### COURSE GOALS AND OBJECTIVES:

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My basic goal in designing this course was to introduce you to the world of business. But the real question is, what do I want you to learn to do? Here the question becomes a bit more complex. The simplest answer I can offer is this: I want you to become aware of the following: 1) how businesses are organized; 2) how and why they succeed; and 3) The ways in which businesses influence your every day life.

This course will introduce you to the business world from the perspectives of management, marketing, operations/production, and human resources. The course will show the interconnection among these fields offering a global vision of the main instruments used in business. Interrelationships will be shown by teaching material common to each of these fields of study. This is to say that there exist certain concepts in marketing that are derived from finding answers in the management section. The goal in each of these sections will be to teach material that will be relevant to the students six months and six years after graduation.

*Note: This course assumes no prior knowledge of any type material.*

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### BIBLIOGRAPHY

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#### Required Texts

- Ferrell, O.C., Hirt. *Business, A Changing World*, 5<sup>th</sup> Edition, McGraw Hill Higher Education

#### Sources Used for Course

- Berkowitz, Eric, and Roger A. Kerin. *Marketing* 6th Edition. Boston: Irwin McGraw-Hill, 2000
- Gagnon, Susan. *Management of Human Resources*. Montreal, McGill University.
- Heizer, Jay, and Barry Render. *Production Operations Management* 2nd Edition. Boston: Alley and Bacon, 1991
- Moore, Geoffrey A. *Inside the Tornado, Marketing Strategies from Silicon Valley's Cutting Edge*. Harper Business, 1999.
- Moore, Karl. *Presentation: Marketing Tips for Case Analysis Studies*. Montreal, McGill University, 2004
- Nath, Sanjeev. *Case Analysis and Presentation Notes*. Montreal: McGill University, 2004
- Waters, C.D.J. *An Introduction to Operations Management*. England: Addison Welsley Publishing Company, 1991

#### Websites:

- <http://www.aatl.net/publications/easyjetmodel.htm>
- [www.adcritic.com](http://www.adcritic.com)





- [www.thetimes100.co.uk](http://www.thetimes100.co.uk)
- <http://www1.us.dell.com/>
- [http://www.usatoday.com/money/industries/technology/2003-01-19-dell-cover\\_x.htm](http://www.usatoday.com/money/industries/technology/2003-01-19-dell-cover_x.htm)
- <http://www.usatoday.com/educate/college/case-studies.htm>

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## GRADING SYSTEM

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Midterm Exam: 35%

Final Exam: 40%

Participation 25%

- General Breakdown:

- Homework: 10%
- Attendance, speaking in class, small group discussion\*: 15%

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## GENERAL REQUIREMENTS

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### Late Homework Assignments:

In exceptional circumstances, late submission of assignments may be permitted without penalty upon discretion of the instructor, as long as notification is sent. Late assignments in other situations will be accepted with severe penalty.

### Late Arrivals:

Wednesday Classes start at 8:00am, or when the door closes. Saturday classes start at 12:00, or when the door closes. During the course of the semester, the rule on late arrival will be adjusted according to class dynamics.

### Case Discussion Days:

Please bring a copy of the case to class each of the four days.

September 27, 30: Course Syllabus, Chapter 1

October 4, 7: Chapter 7

October 11, 14: Guest Speaker, Chapter 8

October 18, 21: Chapter 8, Case Discussion

October 25, 28: Chapter 12

November 1, 4: Holiday, Chapter 13

November 8, 11: Chapter 13, Case Discussion

November 15, 18: No class (discussion is make up\*), Movie

November 22, 25: Chapter 11/to be determined, Midterm Review

December 5: Midterm Exam, 16:00

December 13, 16: Chapter 9, Case Discussion

December 20: Chapter 9

January 10, 13: Chapter 10/Case Discussion, Chapter 10

January 17: No class, Final review class date to be determined

January 18: Exams start

February 6: Final Exam



\*Note: The small group discussion will be offered on 3-4 separate dates, and 3-4 times each day.

### Special Material by Section

#### Introduction to Business – Chapter 1

- Video: Starbucks

#### Management – Chapter 7, Chapter 8

- Guest Speaker (from the United States)
- Coca Cola PowerPoint example
- Case: Bill Ford

#### Marketing – Chapter 12, Chapter 13

- Video: Hotel Monaco
- Commercial examples
- Case Bowling Alley
- Case Bowling Alley

#### Operations/Production – Chapter 9

- Video: New Belgium Brewery
- Case: Hazel's Lawn Mowing Business

#### Human Resources – Chapter 10, Chapter 11

- Video: The Container Store
- Case: Being Homeless

### Other Notes:

#### Small Group Discussion:

The small group discussion replaces 1 class during the year. You will read the article, sign up for one session, and participate in a discussion with 10 other students. It is a great way for students who do not speak in class to earn some extra points. The small group discussion IS REQUIRED.

#### Movie:

The movie to be shown during class is traditionally selected by the students. It must be related to business in some capacity, be shown in English (with English subtitles), and contain appropriate language.

#### Homework:

The homework is listed below. The due date is listed to the left. Certain codes used below are explained here:

- CYP: Check Your Progress
- GI: Get Involved
- BYS: Build your skills

A person who writes normally should take **at least** 3-3.5 pages to answer these questions. **Homework must be written by hand**, not typed and submitted.



## Homework Assignment Due Dates

September 30: Why did you come to the University of Navarra? What was holding you back from coming here? Have we met before you arriving to Navarra? If yes, how?

October 7: **Must have text book**  
Chapter 7  
CYP: 2, 4, 5, 8, 9, 10  
GI: 3  
BYP: Exercise

October 14: Chapter 8  
CYP: 1 – 8  
Answer these 2 questions:  
1) Pick a company and describe its corporate culture. Do not use an example from the book.  
2) Do you think that managers can manage the organization's culture?

October 21: Read the Case and think about the questions. You do not have to hand anything in.

October 28: Chapter 12:  
CYP: 1 – 10 (all questions)  
BYS: Exercise (Do this alone)  
Answer this question. Watch TV and pick 1 commercial. Describe their target market and the approach to reach this market. Describe the marketing environment in which they are competing. Are any of the 4 forces mentioned in your textbook affecting the ability to develop a marketing strategy for this product? For example, due to the **legal force** against smoking, marketers cannot show commercials on TV, and due to the **social force** (attitude), people are trying to quit smoking.  
Note: You may also pick three magazine or newspaper ads.

November 4 : Chapter 13:  
CYP: 1 – 10 (all questions)  
BYS: Exercise. Answer this question: Pick 1 product that you normally use and determine what stage of the product life cycle it is in. Why do you think this is true? Evaluate the marketer's strategy (price, product, placement, promotion) and decide whether marketers are making errors in their strategy.

November 11: Read the Case and think about the questions. You do not have to hand anything in.

November 18: Hopefully someone will have found a movie for us to watch.  
(You will notice that on pg. 304, GI#2, this is a popular learning technique)

November 22: To be determined

December 16: Read the Case and think about the questions. You do not have to hand anything in.



December 20: Chapter 9:  
CYP: 1 – 10 (all questions)

January 10: Read the Case

January 13, 14: Chapter 10:

CYP: 3 – 10

GI: 1 (Should be easy)

Answer this question: Although many companies screen applicants and test employees for illegal drug use, such testing is somewhat controversial. Why does this policy exist?

How do employees feel about this? What would you do if it was your decision to choose whether a company had a drug policy?

Note: I reserve the right to read answers in class. Your name will be kept silent.

### Helpful Communication/Grammar Links (from Business Communication Course)

- OWL (Online Writing Lab) at Purdue
  - o <http://owl.english.purdue.edu/owl/>
- Capital Community College Guide to Grammar and Writing
  - o <http://cctc.commnet.edu/grammar/>
- Using Audience Accommodation for Effective and Ethical Communication
  - o [fie.engrng.pitt.edu/fie2000/papers/1306.pdf](http://fie.engrng.pitt.edu/fie2000/papers/1306.pdf)
- University of North Carolina Writing Center at Chapel Hill
  - o <http://www.unc.edu/depts/wcweb/>
- Princeton University Writing Centre
  - o [http://web.princeton.edu/sites/writing/Writing\\_Center/WCWritingResources.htm](http://web.princeton.edu/sites/writing/Writing_Center/WCWritingResources.htm)
- Communication Across the Curriculum @ the University of Pittsburgh
  - o <http://www.cxc.pitt.edu/audienceadaptation.htm>
- Dave's ESL Café
  - o [www.eslcafe.com](http://www.eslcafe.com)
- Phrasal Verb Demon
  - o <http://takeoff.to/phrasalverbs>
- The Electric Eclectic
  - o <http://www.bloxword.ca/grammar.htm>
- Grammar Slammer
  - o <http://englishplus.com/grammar/>



- HyperGrammar – The University of Ottawa  
<http://www.uottawa.ca/academic/arts/writcent/hypergrammar/grammar.html>

\* Note: all references in this section come from the course, "Business Communication," which can be taken in your second year.



## STATISTICS

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### CONTENTS

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1. Continuous Distributions
  - 1.1 The Normal Distribution
  - 1.2 The Normal Distribution as Approximation of Binomial and Poisson Distributions
  - 1.3 Other Continuous Distributions: Uniform, Exponential, Gamma
  
2. Sample and Sampling Distributions
  - 2.1 Population and Sample
  - 2.2 Simple Random Sample
  - 2.3 Other types of Samples
  - 2.4 Concept of Statistic and Important Statistics
  - 2.5 Sampling Distribution of the Sample Mean (t-Student Distribution)
  - 2.6 Sampling Distribution of the Sample Proportion
  - 2.7 Sampling Distribution of the Sample Variance
  - 2.8 Sampling Distribution of the Difference of Sample Means
  - 2.9 Sampling Distribution of the Difference of Sample Proportions
  - 2.10 Sampling Distribution of the Quotient of Sample Variances (F-Fisher distribution)
  
3. Point Estimation
  - 3.1 Introduction to the Statistical Inference
  - 3.2 Notion of Estimator: difference between Estimator and Statistics
  - 3.3 Properties of Estimators: Unbiasedness, Efficiency, Consistency
  - 3.4 Construction Methods for Estimators (Moment Method, Likelihood Method) and properties of these Estimators
  
4. Interval Estimation
  - 4.1 Confidence level, Pivotal Quantity and Confidence Interval
  - 4.2 Confidence Interval for the Mean of a Normal Distribution with Known Variance
  - 4.3 Confidence Interval for the Mean of a Normal Distribution with Unknown Variance
  - 4.4 Confidence Interval for a Proportion (Large Sample)
  - 4.5 Confidence Interval for the Variance of a Normal Distribution
  - 4.6 Confidence Interval for Difference of Means : Normal Populations, General Case
  - 4.7 Confidence Interval for the Quotient of Variances
  - 4.8 Confidence Interval for the Difference of Two Proportions (Large Samples)
  - 4.9 Sample Size Determination



## 5. Hypotheses Testing

5.1 Basic Concepts : Null Hypothesis and Alternative Hypothesis. Simple or Composed Hypothesis. Acceptation and Rejection Region

5.2 Error Types: 1<sup>st</sup> and 2<sup>nd</sup> type. Power of a Test.

5.3 One Population Test : Test for a Proportion, Test for the mean and Test for the Variance

5.4 Two population Test : Test for the Difference of two Means, Test for the Difference of Two Proportions ( Large Samples ), Test for the Equality of Variance

### Bibliography

#### Basic:

Larry J. Stephens. "Theory and Problems of Beginning Statistics". Schaumms Outline Series.

#### Others:

Casella G. , Berger R. L. "Statistical Inference", Duxbury Press. California.

Mason R. , Lind D. "Statistical Techniques in Business and Economics". Irwin.



## INTRODUCTION TO MACROECONOMICS

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### TEMARIO

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#### A. The data of macroeconomics

1. Measuring a nation's income (pages 507-527)
2. Measuring the cost of living (pages 529-545)

#### B. The real economy in the long run

3. Production and growth (pages 549-573)
4. Saving, investment and the financial system (pages 575-597)
5. The basic tools of finance (pages 597-611)
6. Unemployment (pages 613-637)

#### C. Money and prices in the long run

7. The monetary system (pages 641-659)
8. Money growth and inflation (pages 661-687)

#### D. The macroeconomics of open economies

9. Open-economy macroeconomics: Basic concepts (pages 691-713)
10. A macroeconomic theory of the open economy (pages 715-735)

#### E. Short-run economic fluctuations

11. Aggregate demand and aggregate supply (pages 739-775)
12. The influence of monetary and fiscal policy on aggregate demand (pages 777-799)
13. The short-run trade-off between inflation and unemployment (pages 801-829)





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## BIBLIOGRAPHY

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The textbook for the course is *Principles of Economics* (fourth edition) by N. Gregory Mankiw. The course covers Part 8-12 of the book. The textbook will be complemented by *ad hoc* material to provide additional empirical coverage of the macroeconomic performance of countries at various stages of economic development.

Both the mid-term and the final exam will be mostly based on multiple-choice questions.



## FUNDAMENTALS OF FINANCE AND MARKETING

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### **COURSE GOALS:**

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The goal of this course is to introduce students to the business world from the perspectives of Marketing and Accounting/Finance. The course will show the interconnection between these fields offering students a global vision of the main instruments used in these areas of study.

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### **COURSE DESCRIPTION:**

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The course is broken up into three parts: 1) Marketing; 2) Accounting; and 3) Finance. Interrelationships will be shown by teaching material common to each of these fields of study. This is to say that there exist certain concepts in Marketing that are derived from finding answers in Accounting. The goal in each of these sections will be to teach materials that will be relevant to the student's six months and six years after graduation. In addition, students will complete a group case study and compete to have the opportunity to present their results to the class. Here, the ideas of teamwork and case analysis & presentation skills will be stressed.

*Note: This course assumes no prior knowledge of any type material.*

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### **GROUP PROJECT**

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Working in teams of five, students will be asked to analyze a case, prepare a written solution, and create a PowerPoint Presentation. As this may be your first university case, one class will be devoted to teaching methods of case analysis, describing the sections of the paper and the presentation, and will offer tips on presentation skills. The top three 3 teams will present their solutions in front of the class either the week before or the week after the holiday break. They are also the groups who are guaranteed to receive top marks in this section. Final round judging will be partially be determined by the students of the class.

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### **EVALUATION METHOD:**

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#### **Section 1: With Sanjeev Nath until Easter break**

Midterm (April 6<sup>th</sup>) 25%  
Group Project (Due 18<sup>th</sup> ) 20%

#### **Section 2: With Mike Lynch from Easter break**

Final (Cumulative, Non-Cumulative TBD) 45%

Overall Participation Level 10%



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*BIBLIOGRAPHY FOR SECTION 1*

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1. Atkinson, Anthony, and Rajiv Banker. Management Accounting 3<sup>rd</sup> Edition. New Jersey: Prentice Hall, 2001
2. Berkowitz, Eric, and Roger A. Kerin. Marketing 6<sup>th</sup> Edition. Boston: Irwin McGraw-Hill, 2000
3. Bodie, Ivi, and Robert Merton. Finance. New Jersey: Prentice Hall, 2000
4. Gagnon, Susan. Management of Human Resources. Montreal, McGill University, 2003
5. Ferrell, O.C., and Geoffrey Hirt. Business, A Changing World 4<sup>th</sup> Edition. Boston: Irwin McGraw-Hill, 2003
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14. <http://www1.us.dell.com/content/topics/global.aspx/corp/background/en/directmodel?c=us&tl=en&ts=corp>
15. [http://www.usatoday.com/money/industries/technology/2003-01-19-dell-cover\\_x.htm](http://www.usatoday.com/money/industries/technology/2003-01-19-dell-cover_x.htm)
16. <http://www.usatoday.com/educate/college/case-studies.htm>

Note: Most textbooks are available in my office

*How to get to the website*

<http://www.unav.es/econom/>  
[http://www.unav.es/empresa/fundafinanymerca/pagina\\_9.html](http://www.unav.es/empresa/fundafinanymerca/pagina_9.html)