SIMULATING AND MODELING TO UNDERSTAND CHANGE

Bachelor in Data and Business Analytics BDBA SEP-2023 SMUC-DBA.1.S.A

Area Others

Number of sessions: 35

Academic year: 23-24

Degree course: FIRST

Number of credits: 6.0

Semester: 2º

Category: BASIC

Language: English

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ANTONIO LÓPEZ ROSELL

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Antonio López is a sociologist specialized in the field of Business Design and Data Analysis. He holds a Bachelor in Sociology and a Master's Degree in Management and Research of Business Communication from the Universidad Rey Juan Carlos (Madrid, Spain), an MBA from the lazarus project developed by the "Escuela de Organización Industrial" and the "Caja Rural" (Ciudad Real, Spain) and an Executive Master in Data Science and Machine Learning from KSchool (Madrid, Spain). His research interests include social sciences, machine learning and deep learning techniques and statistical computing in R and Python. He has worked as a researcher for the European Social Fund, has created the company Wibber (based on artificial intelligence systems for social media management) and currently works in his own Artificial Intelligence consultancy (Compai) in which they carry out training and implementation projects of digitization based on Artificial Intelligence systems for big companies. Also, he collaborates as a mentor or facilitator for innovative projects of companies and accelerators like The Coca Cola Company and Founder Institute.

Office Hours

Office hours will be on request. Please contact at:

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SUBJECT DESCRIPTION

Simulation and modeling is an emerging area of scientific investigation. Putting it simple, simulation and modeling is a substitute for physical experimentation in which computers are used to explore some physical phenomena. It can then facilitate the understanding of a particular system without testing the system in the real world. It also has some advantages over physical experimentation. For example, simulations can be more realistic than traditional experiments and can be conducted faster. Simulation is used in many areas of natural and social sciences, such as mathematics, physics, engineering, psychology, and biology. In each of these areas we can define systems with really complex activities that emerge from smaller individual elements. We use simulation and modeling to understand those systems and predict their behavior.

This course covers Monte Carlo Simulation, Discrete Events Simulation, Model Building and Regression and Classification Models, and will discuss how simulation and modeling can be used to solve real-life problems. Students will learn and practice statistics and programming. At the end of the course, the students will know how to conduct a simulation study and to model some real-life scenarios.

PREREQUISITES
Basic knowledge of Mathematics. It is highly recommended to have passed the Fundamentals of probability & statistics and Data insights and visualization courses from the previous semester. Beginner to moderate levels of R programming.

LEARNING OBJECTIVES

The main topics covered in this course are the following:

- Random Number generation
- Random Variables generation
- Monte Carlo Simulation
- Discrete Events Simulation
- Regression models
- Classification models

CORE TOPICS

The 8 Core Topics or Modules of the course will be:

- Module 1: Introduction to SMUC
- Module 2: Random Numbers Generation
- Module 3: Random Variables Simulation
- Module 4: Monte Carlo Simulation
- Module 5: Discrete Events Simulation
- Module 6: Model Building
- Module 7: Regression models
- Module 8: Classification models

TEACHING METHODOLOGY

IE University teaching method is defined by its collaborative, active, and applied nature. Students actively participate in the whole process to build their knowledge and sharpen their skills. Professor's main role is to lead and guide students to achieve the learning objectives of the course. This is done by engaging in a diverse range of teaching techniques and different types of learning activities such as the following:

Learning Activity	Weighting	Estimated time a student should dedicate to prepare for and participate in
Lectures	20.0 %	30.0 hours
Discussions	20.0 %	30.0 hours
Exercises in class, Asynchronous sessions, Field Work	13.33 %	20.0 hours
Group work	26.67 %	40.0 hours
Individual studying	20.0 %	30.0 hours
TOTAL	100.0 %	150.0 hours

PROGRAM

IMPORTANT: The following program is tentative. Although we will attempt to cover all the listed topics as specified, the pace of the class depends on group performance.

SESSION 1 (LIVE IN-PERSON)

MODULE 1: INTRODUCTION FOR SIMULATION AND MODELING TO UNDERSTAND THE CHANGE

Module 1/8: Introduction to Simulation and Modeling

Session 1/2: Course Presentation

In this session, we will start getting to know each other. Then I will present the most important aspects of the course and the syllabus and we will define the groups you will form for the rest of the course.

Learning Blocks:

- 1st slot: 30 min. Knowing each other.
- 2nd slot: 50 min. Course specifications.

SESSION 2 (LIVE IN-PERSON)

Module 1/8: Introduction to Simulation and Modeling

Session 2/2: Introduction to Simulation and Modeling

In this session, we will start with some introductory theoretical aspects about simulation and modeling, we will define what a system is and we will see some practical examples.

Learning Blocks:

- 1st slot: 20 min. Systems, Models and Simulation. Understanding some terminology.
- 2nd slot: 40 min. Why do we use Simulation? The different types of Simulation. The different stages in a Simulation. Methodology
- 3rd slot: 40 min. What is a model? Predictive statistics. The different types of models. Methodology

SESSION 3 (LIVE IN-PERSON)

Module 2/8: Random Numbers Generation

Session 1/2: Generating Random Numbers

When we want to simulate any stochastic behavior using computer simulation is essential to develop methods to generate random numbers. In this session we will learn the properties of random numbers and how to generate them.

Learning Blocks:

- 1st slot: 20 min. Random Numbers properties
- 2nd slot: 30 min. Random Numbers generation
- 3rd slot: 30 min. In-class exercises. The Linear Congruential Method.

SESSION 4 (LIVE IN-PERSON)

Module 2/8: Random Numbers Generation

Session 2/2: Tests of Randomness

In further sessions, when creating simulation programs, we will assume that R is generating random numbers correctly. In this session we will learn about tests of randomness and we will pass those tests to the R functions for creating random numbers.

Learning Blocks:

- 1st slot: 20 min. Testing Uniformity
- 2nd slot: 30 min. Testing Independence
- 3rd slot: 30 min. In-class exercises.

SESSION 5 (LIVE IN-PERSON)

Module 3/8: Random Variables Generation

Session 1/3: Simulating Discrete Random Variables

Sometimes, when creating simulation programs, we want to simulate non-random behaviors in our variables. There are several random variables following different distributions that allow us to simulate many different kinds of scenarios. In this session we will see how to simulate discrete random variables using R.

Learning Blocks:

- 1st slot: 15 min. Simulating a RV that follows a Bernoulli Distribution.
- 2nd slot: 15 min. Simulating a RV that follows a Binomial Distribution.
- 3rd slot: 15 min. Simulating a RV that follows a Geometric Distribution.
- 4th slot: 15 min. Simulating a RV that follows a Poisson Distribution.
- 5th slot: 20 min. In-class exercises.

SESSION 6 (LIVE IN-PERSON)

Module 3/8: Random Variables Generation

Session 2/3: Simulating Continuous Random Variables

Sometimes, when creating simulation programs, we want to simulate non-random behaviors in our variables. There are several random variables following different distributions that allow us to simulate many different kinds of scenarios. In this session we will see how to simulate continuous random variables using R.

Learning Blocks:

- 1st slot: 20 min. Simulating a RV that follows a Uniform Distribution.
- 2nd slot: 20 min. Simulating a RV that follows a Normal Distribution.
- 3rd slot: 20 min. Simulating a RV that follows an Exponential Distribution.
- 4th slot: 20 min. In-class exercises.

SESSION 7 (LIVE IN-PERSON)

Module 3/8: Random Variables Generation

Session 3/3: Random Variables Generation Lab

In this session, students will work in groups to complete a guided lab

Learning Blocks:

1st slot: 10 min. Lab explanation and delivery instructions.
2nd slot: 70 min. Guided lab completion.

SESSION 8 (LIVE IN-PERSON)

Module 4/8: Monte Carlo Simulation

Session 1/4: Monte Carlo Simulation I

Monte Carlo Method is probably the most famous tool for simulation. In this session we will learn about Monte Carlo history, we will understand the difference between Monte Carlo methods and Monte Carlo simulation, we will integrate the different steps in a Monte Carlo simulation and finally we will carry on a Monte Carlo simulation experiment to estimate the Pi number.

Learning Blocks:

- 1st slot: 10 min. Monte Carlo History.
- 2nd slot: 10 min. Monte Carlo Methods vs. Monte Carlo Simulation.
- 3rd slot: 15 min. Steps in a Monte Carlo Simulation.
- 4th slot: 45 min. Use case. Pi number experiment.

SESSION 9 (LIVE IN-PERSON)

Module 4/8: Monte Carlo Simulation

Session 2/4: Monte Carlo Simulation II

Monte Carlo Simulation is a very useful tool when we want to make inferences about real world scenarios. In this session we will learn one of the most useful uses of Monte Carlo Simulation, that is Monte Carlo for Inference.

Learning Blocks:

- 1st slot: 40 min. What is Inferential statistics?
- 2nd slot: 40 min. How can we use Monte Carlo Simulation for Inference?

SESSIONS 10 - 11 (LIVE IN-PERSON)

Module 4/8: Monte Carlo Simulation

Session 3/4: Monte Carlo Simulation III

Monte Carlo Simulation is a very useful tool when we want to make inferences about real world scenarios. In this session we will learn one of the most useful uses of Monte Carlo Simulation, that is Monte Carlo for Inference.

Learning Blocks:

1st slot: 40 min. Use case. The taxi problem experiment.
2nd slot: 40 min. Use case. The sampling problem experiment.

Module 4/8: Monte Carlo Simulation

Session 4/4: Monte Carlo Simulation Lab

In this session, students will work in groups to complete a guided lab about Monte Carlo Simulation.

Learning Blocks:

- 1st slot: 10 min. Lab explanation and delivery instructions.
- 2nd slot: 70 min. Guided lab completion.

SESSION 12 (LIVE IN-PERSON)

Module 5/8: Discrete Events Simulation

Session 1/4: Discrete Events Simulation I

Unlike Monte Carlo methods, which allow us to simulate events based on variables that change constantly over time, the Discrete Events Simulation (DES) will help us to model the behavior of systems based on a sequence of discrete events over time. In this session we will learn the very basics about DES and how to implement DES in R using simmer.

Learning Blocks:

- 1st slot: 30 min. Intro to DES. Terminology and framework.
- 2nd slot: 50 min. The simmer package.

SESSION 13 (LIVE IN-PERSON)

Module 5/8: Discrete Events Simulation

Session 2/4: Discrete Events Simulation II

In this session we will learn how to extract information from a DES using simmer.

Learning Blocks:

- 1st slot: 40 min. Simulating a hospital queue in R
- 2nd slot: 40 min. Interpreting simmer results

SESSION 14 (LIVE IN-PERSON)

Module 5/8: Discrete Events Simulation

Session 3/4: Discrete Events Simulation III

In this session we will learn how to optimize the resources using the results of a simulation and we will create our first DES.

Learning Blocks:

- 1st slot: 40 min. Optimizing resources in a simulation experiment.
- 2nd slot: 40 min. In-class exercise. How to define a system for DES.

SESSION 15 (LIVE IN-PERSON)

Module 5/8: Discrete Events Simulation

Session 4/4: Discrete Events Simulation lab

In this session, students will work in groups to complete a guided lab about Discrete Events Simulation.

Learning Blocks:

- 1st slot: 10 min. Lab explanation and delivery instructions.
- 2nd slot: 70 min. Guided lab completion.

SESSION 16 (LIVE IN-PERSON)

MIDTERM EXAM

SESSION 17 (LIVE IN-PERSON)

Module 6/8: Model Building

Session 1/2: Model Building I

When we want to analyze or even predict what is happening around us, we make use of mathematical models. It is also necessary that we know the basic elements that make up a model to perform any type of simulation. In this session we will learn how to read and design models.

Learning Blocks:

- 1st slot: 10 min. Functions vs. Models.
- 2nd slot: 30 min. Reading Models.
- 3rd slot: 40 min. Model Design.

SESSION 18 (LIVE IN-PERSON)

Module 6/8: Model Building

Session 2/2: Model Building II

In this session, we will learn how to find patterns in our variables and between our variables. We will also learn about Cross Validation techniques and why they are so important in stochastic models.

Learning Blocks:

- 1st slot: 20 min. Variation analysis
- 2nd slot: 20 min. Covariation analysis.
- 3rd slot: 40 min. Cross Validation.

SESSION 19 (LIVE IN-PERSON)

Module 7/8: Linear Regression

Session 1/10: Simple Linear Regression I

When we try to predict the behavior of a variable in a stochastic model, depending on its nature, we will say that we face a regression or classification problem. In this session we will define what a regression problem is and explain the most basic aspects of Simple Linear Regression (LR), the most popular technique to solve this kind of problem.

Learning Blocks:

- 1st slot: 20 min. Simple LR introduction.
- 2nd slot: 20 min. Theoretical demonstration of a Simple LR.

SESSION 20 (LIVE IN-PERSON)

Module 7/8: Linear Regression

Session 2/10: Simple Linear Regression II

In this session we will learn about the most important statistics to interpret the results of a Simple LR.

Learning Blocks:

- 1st slot: 40 min. Simple LR with simulated data.
- 2nd slot: 40 min. Theoretical interpretation of the most important statistics in a Simple LR.

SESSION 21 (LIVE IN-PERSON)

Module 7/8: Linear Regression

Session 3/10: Simple Linear Regression III

In this session we will learn about the most important statistics to interpret the results of a Simple LR using R.

Learning Blocks:

- 1st slot: 40 min. Interpretation of the most important statistics in a Simple LR.
- 2nd slot: 40 min. Simple LR implementation in R.

SESSION 22 (LIVE IN-PERSON)

Module 7/8: Linear Regression

Session 4/10: Multiple Linear Regression

In this session we will learn how to include more than one variable in a linear regression model.

Learning Blocks:

- 1st slot: 40 min. Multiple Linear Regression implementation in R
- 2nd slot: 40 min. Interpreting the results of a MLR in R. The multicollinearity problem.

SESSION 23 (LIVE IN-PERSON)

Module 7/8: Linear Regression

Session 5/10: Residuals and Assumptions

Analyzing the residuals of a LR is essential to determine the quality of our model. We will learn how to interpret the residuals of a LR model and how to check all the assumptions we must fulfill to generalize our results.

Learning Blocks:

- 1st slot: 40 min. The error component. How can we interpret the residuals of a LR?
- 2nd slot: 40 min. Assumptions we need to check to generalize our results.

SESSION 24 (LIVE IN-PERSON)

Module 7/8: Linear Regression

Session 6/10: Categorical variables and Interaction effects.

LR models can hold many different kinds of parameters. So far we have learned how to include main effects through continuous variables in our models, but we have other possible explanatory variables or interaction between variables that can affect the predictions of our models. In this session we will learn how to include and interpret categorical variables and interaction effects in our LR models.

Learning Blocks:

- 1st slot: 40 min. Categorical variables in a LR model. Dummy variables vs. Factors. Interpreting the results.
- 2nd slot: 40 min. Interaction effect in a LR model. How to interpret different interaction effects.

SESSION 25 (LIVE IN-PERSON)

Module 7/8: Linear Regression

Session 7/10: Polynomial Regression

Main effects in a LR allows us to adjust the slope and the intercept of our explanatory model, but we are limited by these two different components. There are some situations in which we can explain the behavior of our dependent variable using second, third, … order effects. In this session we will learn how to define polynomial effects of order two or more to improve the predictions of our models.

Learning Blocks:

- 1st slot: 20 min. Identifying potential polynomial effects in our models using the residuals.
- 2nd slot: 30 min. Implementing polynomial regression models in R
- 3rd slot: 30 min. Interpreting the results of a polynomial regression.

SESSION 26 (LIVE IN-PERSON)

Module 7/8: Linear Regression

Session 8/10: Variable Selection and Cross Validation

When we want to create a model, we need to navigate between the two dangerous realities, the overfitting and the underfitting. In this session we will learn different techniques to select the optimal variables to obtain the best possible fit in our models, and we will learn how to apply Cross Validation techniques to avoid overfitting.

Learning Blocks:

- 1st slot: 40 min. Variable Selection: ANOVA, Best Subset Regression, Stepwise Selection.
- 2nd slot: 40 min. Cross Validation in a LR model.

SESSIONS 27 - 28 (LIVE IN-PERSON)

Module 7/8: Linear Regression

Session 9/10: Linear Regression Lab I

In this session, students will work in groups to complete a guided lab about Linear Regression.

Learning Blocks:

- 1st slot: 10 min. Lab explanation and delivery instructions.
- 2nd slot: 70 min. Guided lab completion.

Module 7/8: Linear Regression

Session 10/10: Linear Regression Lab II

In this session, students will continue working in groups to complete a guided lab about Linear Regression.

Learning Blocks:

- 1st slot: 80 min. Guided lab completion.

SESSION 29 (LIVE IN-PERSON)

Module 8/8: Logistic Regression

Session 1/6: From Linear Regression to Logistic Regression

As we have stated before, when we are modeling reality we can face two kinds of problems: regression and classification. When the variable we want to predict has discrete nominal values, the Linear Regression logic does not apply and we need to find a way to classify between categories instead of predicting a tendency. The most basic classification technique is called Logistic Regression, and it comes from a transformation of the already learned method of Linear Regression. In this session we will understand the mathematics behind the Logistic Regression Model.

Learning Blocks:

- 1st slot: 20 min. Linear Regression vs. Logistic Regression.
- 2nd slot: 30 min. Mathematics behind Logistic Regression.

SESSION 30 (LIVE IN-PERSON)

Module 8/8: Logistic Regression

Session 2/6: From Linear Regression to Logistic Regression

Learning Blocks:

- 1st slot: 40 min. From Linear Regression to Logistic Regression, the Logit transformation.
- 2nd slot: 40 min. Interpretation of the most important statistics in Logistic Regression.

SESSION 31 (LIVE IN-PERSON)

Module 8/8: Logistic Regression

Session 3/6: Logistic Regression implementation in R

In this session we will learn how to implement a Logistic Regression model in R and how to interpret the results.

Learning Blocks:

- 1st slot: 40 min. Logistic Regression implementation in R.
- 2nd slot: 40 min. Logistic Regression results interpretation.

SESSION 32 (LIVE IN-PERSON)

Module 8/8: Logistic Regression

Session 4/6: Logistic Regression validation

Given that the nature of the dependent variable in a classification problem is different, we will also need different tools to validate and generalize our models. In this session we will learn about the different statistics that we can use to validate our classification models.

Learning Blocks:

- 1st slot: 40 min. Confusion Matrix and Cutoff point
- 2nd slot: 40 min. ROC curves.

SESSIONS 33 - 34 (LIVE IN-PERSON)

Module 8/8: Logistic Regression

Session 5/6: Logistic Regression Lab I

In this session, students will work in groups to complete a guided lab about Logistic Regression.

Learning Blocks:

- 1st slot: 10 min. Lab explanation and delivery instructions.
- 2nd slot: 70 min. Guided lab completion.

Module 8/8: Logistic Regression

Session 6/6: Logistic Regression Lab II

In this session, students will continue working in groups to complete a guided lab about Logistic Regression.

Learning Blocks:

- 1st slot: 80 min. Guided lab completion.

SESSION 35 (LIVE IN-PERSON)

FINAL EXAM

EVALUATION CRITERIA

Your final grade in the course will be based on your participation, the completion of the course labs, the different module quizzes and two exams (Midterm and Final). The weight of each one will be as follows:

criteria	percentage	Learning Objectives	Comments
Class Participation	10 %		
Labs	25 %		

Quizzes	15 %		
Midterm Exam	20 %		
Final Exam	30 %		

RE-SIT / RE-TAKE POLICY

Participation (10%)

Active participation in-class activities, discussions, and labs is an especially important aspect in this course because our focus will be on understanding how the concepts discussed in class can be applied in real-world contexts. Class attendance will also be taken into account to measure participation. This attendance may deduct points. Specifically, 1% will be deducted for each missed class unless official documentation (e.g., from a medical doctor, counselor) of illness or other extenuating circumstances is provided to the professor within 24 hours of the missed class.

Group Work (Labs) (25%)

A total of 4 labs will be conducted throughout the course. These labs are a tool to help the student apply the concepts acquired during each session. During the labs, students will work in groups. These groups will be formed in the first synchronous class if possible. The labs will be delivered before the next synchronous class via Turnitin. 5% of the 25% graded will be done by Peer Evaluation. After each lab, you will be asked to evaluate your classmates through a simple survey.

Quizzes (15%)

Students will have to complete a quiz or more after each of the 8 modules that make up the course.

Midterm exam (20%)

Students will take a test through the blackboard platform in which they will be asked about the content so far. The exam will be composed of multiple choice and open-ended questions.

Final exam (30%)

Students will take a test through the blackboard platform in which they will be asked about all the course content. The exam will be composed of multiple choice and open-ended questions.

Late Assignments/Presentation:

Will be penalized 5% per 24-hour period, starting on the day they are due. Only in cases of emergency or illness can changes be made to due dates of assignments or projects. ALL such arrangements are the full responsibility of the student and must be made PRIOR to the due date. Failure to confirm any changes to the due date with the professor prior to the due date will result in a grade of zero.

BIBLIOGRAPHY

Recommended

- Robert, C. P., Casella, G., & Casella, G.. (2010). *Introducing monte carlo methods with r.* New York: Springer.. ISBN 9781441915757 (Printed)

BEHAVIOR RULES

Please, check the University's Code of Conduct here. The Program Director may provide further indications.

1. Be on time: : Students arriving late will be marked as “Absent”. Only students that notify in advance in writing that they will be late for a specific session may be granted an exception (at the discretion of the professor).

2. If applicable, bring your name card and strictly follow the seating chart. It helps faculty members and fellow students to learn your names.

3. Do not leave the room during the lecture: Students are not allowed to leave the room during lectures. If a student leaves the room during lectures, he/she will not be allowed to re-enter and, therefore, will be marked as “Absent”. Only students that notify that they have a special reason to leave the session early will be granted an exception (at the discretion of the professor).

4. Do not engage in side conversation. As a sign of respect toward the person presenting the lecture (the professor as well as fellow students), side conversations are not allowed. If you have a question, raise your hand and ask it. It you do not want to ask it during the lecture, feel free to approach your professor after class. If a student is disrupting the flow of the lecture, he/she will be asked to leave the classroom and, consequently, will be marked as “Absent”.

5. Use your laptop for course-related purposes only. The use of laptops during lectures must be authorized by the professor. The use of Social Media or accessing any type of content not related to the lecture is penalized. The student will be asked to leave the room and, consequently, will be marked as “Absent”.

6. No cellular phones: IE University implements a “Phone-free Classroom” policy and, therefore, the use of phones, tablets, etc. is forbidden inside the classroom. Failing to abide by this rule entails expulsion from the room and will be counted as one absence.

7. Escalation policy: 1/3/5. Items 4, 5, and 6 above entail expulsion from the classroom and the consequent marking of the student as “Absent.” IE University implements an “escalation policy”: The first time a student is asked to leave the room for disciplinary reasons (as per items 4, 5, and 6 above), the student will incur one absence, the second time it will count as three absences, and from the third time onward, any expulsion from the classroom due to disciplinary issues will entail 5 absences.

ATTENDANCE POLICY

Please, check the University's Attendance Policy here. The Program Director may provide further indications.

For In-Person programs, students should attend their live in-person sessions on campus.

Attendance at all scheduled classes is mandatory and essential for success in the course. In order to pass the course the student must attend, at least, 70% of the sessions. Students attending less than 70% of sessions will be graded with a FAIL for the course. This fail will apply to the ordinary and extraordinary calls of the current academic year.

If you miss class for any reason, you are responsible for getting notes from classmates. If you have questions about any assignment please send me an email. Under most circumstances, students who miss a class in which a presentation, mid-term, or final exam is held will not be granted an exception or given an opportunity to do a make-up assignment or exam. However, if illness or other circumstances prevent you from adhering to the assignment/presentation due dates stated in this syllabus, contact your academic director to ask for an exception.

Students with Special Needs:

To request academic accommodations due to a disability, please contact Robert Polding via email at: rpolding@faculty.ie.edu

ETHICAL POLICY

Please, check the University's Ethics Code here. The Program Director may provide further indications.

Student Privacy Statement:

At times, students may disclose personal information through class discussions. It is expected that all members of the class will respect the privacy of their classmates. This means that the information disclosed in the class will not be repeated or discussed with other students outside of the course.

Decisions about Grades:

Decisions about grades are made very carefully, and are final at the end of the course. If you have questions regarding a certain grade or you would like to receive personal feedback, you must request a meeting with me to discuss grades on specific assignments before the last class of the course. Any disputes regarding grades must be resolved before the final exam. “Extra credit” or makeup assignments will only be allowed under extenuating circumstances at the sole discretion of the course professor.

ACADEMIC INTEGRITY

Unless you are specifically instructed to work with other students in a group, all of your assignments, papers, projects, presentations, and any work I assign must reflect your own work and thinking.

What is academic integrity? When you do the right thing even though no one is watching. The core values of integrity, both academic and otherwise include: honesty, fairness, respect, responsibility, and trust. Academic Integrity requires that all students within Instituto de Empresa (IE) act in accordance with these values in the conduct of their academic work, and that they follow the rules and regulations concerning the accepted conduct, practices and procedures of academic research and writing. Academic Integrity violations are defined as Cheating, Plagiarism or other violations of academic ethics.

Cheating and plagiarism are very serious offenses governed by the IE student code of conduct. Any student found cheating or plagiarizing on any assignment or component of this course will at a minimum receive a “0” on the affected assignment. Moreover, the student will also be referred to the University Judicial System for further action. Additional penalties could include a note on your transcript, failing the class, or expulsion from the university.

It is important to note that, while the list below is comprehensive, it should not be considered exhaustive.

Cheating includes:

1. An act or attempt to give, receive, share, or utilize unauthorized information or unauthorized assistance at any time for assignments, papers, projects, presentations, tests or

examinations.

2. Students are permitted to mentor and/or assist other students with assignments by providing insight and/or advice. However, students must not allow other students to copy their work, nor will students be permitted to copy the work of other students. Students must acknowledge when they have received assistance from others.
3. Failure to follow rules on assignments, papers, projects, presentations, tests or examinations as provided by the course professor and/or as stipulated by IE.
4. Unauthorized co-operation or collaboration.
5. Tampering with official documents, including electronic records.
6. The impersonation of a student on presentations, exercises, tests or an examination. This includes logging onto any electronic course management tool or program (e.g. Black Board, etc.) using someone else's login and password.

Plagiarism includes:

1. Using the work of others and attempting to present it as your own. For example, using phrases or passages from books, articles, newspapers, or the internet and not referencing them properly in your document. This includes using information from others without citing it, misrepresentation of cited work, and misuse of quotation marks.
2. Submitting an assignment or paper that is highly similar to what someone else has written (i.e., minimal changes in wording, or where the sentences are similar, but in a different order).
3. You don't have to commit "word for word" copying to plagiarize – you can also plagiarize if you turn in something that is "thought for thought" the same as someone else.

Other violations of academic ethics include:

1. Not acknowledging that your work or any part thereof has been submitted for credit elsewhere.
2. Misleading or false statements regarding work completed.
3. Knowingly aiding or abetting anyone in committing any form of an Academic Integrity violation.