APPLIED STATISTICS I in Fall 2020 (MA1020B)

Course Code	MA1020B	**Professor(s)**	Ruth Corran
Prerequisites	None	**Office Number**	PL-110
Class Schedule	F: 09:00-10:35 in PL-1 T: 14:30-16:05 in PL-1 W: 14:30-16:05 in Q-704	**Office Hours**	By appointment - preferably Monday or Thursday mornings by Teams
Credits	4	**Email**	rcorran@aup.edu
Semester	Fall 2020	**Office Tel. Ext.**	

Course Description

The course Applied Statistics introduces the basic tools of descriptive and inferential statistical analysis. In this course, we will cover the data-analysis concepts and procedures used in economics, business and other social sciences. Emphasis will be given to the manipulation of real data sets to obtain useful and meaningful statistical results, to the qualitative interpretation of such results and to the effective communication in numbers, graphs and words of the insights thus developed. Theory will be combined with data collection and curation, as well as computer lab work with a statistical software package. Students will be encouraged to develop an attitude of mind that accepts uncertainty and variability as part of problem analysis and decision making.

Course Learning Outcomes

Develop a positive approach to mathematics.
Appreciate the use of mathematics in modeling the world.
Reason with quantitative information – in words, numbers and graphs and charts.
Clearly communicate quantitative information in words, in numbers and with graphs.
Develop strategies for solving problems.
Use descriptive statistics to describe samples, populations, and relationships between variables (independence, regression).
Use techniques of inferential statistics appropriately (confidence intervals, hypothesis tests for proportions, means, chi-squared tests and linear regression).
Take into account uncertainty and ethics applied to statistics.
Have familiarity and fluency in using a statistical software package.

General Education

MA 1020 *Applied Statistics* fulfills the *Quantitative Reasoning* component of AUP's Global Liberal Arts Core Curriculum (GLACC), and as such has the following learning objectives:

LO 1. A. Develop a positive approach to mathematics and …

LO 1. B. … to appreciate its use in modeling the world

LO 2. Reason with quantitative information – in words, numbers and graphs and charts

LO 3. Clearly communicate quantitative information in words, in numbers and with graphs

LO 4. Develop strategies for solving problems

Course Outline

In addition to the quantitative reasoning general education learning outcomes, *Applied Statistics I* has the following course-specific learning outcomes:

LO 5. Use descriptive statistics to describe samples, populations, and relationships between variables (independence, regression)

LO 6. Use techniques of inferential statistics appropriately (confidence intervals, hypothesis tests, chi-squared tests and linear regression)

LO 7. Take into account uncertainty and ethics applied to statistics

LO 8. Have familiarity and fluency in using a statistical software package

Typical class sessions consist of the introduction of a new concept or skill, worked out in a number of different examples or case studies, interspersed with similar exercises to give students the chance to practise skills on their own and in small group situations. Active participation in class activities and discussion is necessary for students to master the concepts and skills. Classes will take place in the computer lab where students learn to use the statistical software package Data Desk.

Students are expected to work between 2 and 4 hours outside the classroom for each class meeting, including 2 hours per week of computer work outside class times. *Late work will not be accepted without a valid reason.*

Tentative class schedule:

Tuesday 14h30		Wednesday 14h30			Friday 9h00
Date	TOPIC	Date	Test topic	Lab topic	Date
		23/9/20		Intro, Lab 1: DSK for cat vars	25/9/20
29/9/20	Describe Numerical variables	30/9/20	Test 1: Cat & Num vars	Lab 2: DSK for num vars	2/10/20
6/10/20	Normal distribution	7/10/20	Test 2: Comparing vars	Lab 3: Normal distributions	9/10/20
13/10/20	Scatterplots & linear regression	14/10/20	Test 3: Normal distributions	Lab 4: Linear regression	16/10/20
20/10/20	Randomness & simulating by hand	21/10/20	Test 4: Linear Regresssion	Lab 5: simulations, sampling	23/10/20
27/10/20	Experiments & observational studies	28/10/20	Test 5: Simulations & sampling	Lab 6: Sampling dist. Models	30/10/20
3/11/20	Confidence intervals for proportions	4/11/20	Test 6: Sampling dist models	Lab 7: inference for means	6/11/20	Testing hyp proportions
10/11/20	Testing hypotheses for means	11/11/20	MIDSEM	BREAK	13/11/20	MIDSEM E
17/11/20	Inference for comparing numerical vars	18/11/20	Test 7: Inference for a prop.	Lab 8: Inference for Comparing numerical variables	20/11/20	More abou hypotheses
24/11/20	Chi-squared tests: comparing categorical vars	25/11/20	Test 10: Inference for num vars	Lab 9: Chi-squared tests	27/11/20	Regression
1/12/20	Inference for regression	2/12/20	Test 9: chi-square tests	Lab 10: Inf'ce for regression	4/12/20	Basics of p
8/12/20	Probability models	9/12/20	Test 10: Inf'ce for Regression	NO LAB. Probability models to sampling distributions	11/12/20	Revision
15/12/20		16/12/20			18/12/20	17h30 Fina

Textbooks

Title	Author	Publisher	ISBN	Required
STATS: DATA & MODELS., 4TH NEW ED.	De Veaux, Velleman, Bock	Pearson	9781292101637	Yes

Attendance Policy

Students studying at The American University of Paris are expected to attend ALL scheduled classes, and in case of absence, should contact their professors to explain the situation. It is the student's responsibility to be aware of any specific attendance policy that a faculty member might have set in the course syllabus. The French Department, for example, has its own attendance policy, and students are responsible for compliance. Academic Affairs will excuse an absence for students' participation in study trips related to their courses.

Attendance at all exams is mandatory.

IN ALL CASES OF MISSED COURSE MEETINGS, THE RESPONSIBILITY FOR COMMUNICATION WITH THE PROFESSOR, AND FOR ARRANGING TO MAKE UP MISSED WORK, RESTS SOLELY WITH THE STUDENT.

Whether an absence is excused or not is ALWAYS up to the discretion of the professor or the department. Unexcused absences can result in a low or failing participation grade. In the case of excessive absences, it is up to the professor or the department to decide if the student will receive an "F" for the course. An instructor may recommend that a student withdraw, if absences have made it impossible to continue in the course at a satisfactory level.

Students must be mindful of this policy when making their travel arrangements, and especially during the Drop/Add and Exam Periods.

Covid-19 temporary amendments:

Students studying at The American University of Paris are STILL EXPECTED TO ATTEND ALL scheduled classes. Due to the Covid-19 pandemic, students will have the option of attending classes remotely when special circumstances apply, for example when students are

placed under quarantine by the French authorities or by their doctor, or when students present symptoms of Covid-19 and are directed, by their doctor or the AUP Health Office, to remain home. It is still the student's responsibility to be aware of any specific attendance policy that their professor might have set in the course syllabus. In particular, Students attending remotely from distant time zones should check with their professors about the specific attendance policy for remote learners.

Grading Policy

Class tests (10 tests, lowest dropped)	35 points
Homework, lab work, projects, assignments	40 points
Final examination	25 points

Other

Class tests: At the beginning of each Wednesday class there will be a test of about 20 minutes duration. In general, the quiz will be on the material covered in the previous week. The test questions will be related to, and similar to, the homework and lab questions. They may involve both handwritten responses and computer work using the Data Desk statistical software package. The computer lab session will begin directly after the quiz.

Homework. You will complete your homework in the Teams Class Notebook, in the "Homework" section, with a new "page" for each class. Homework will be set each class and checked during the following class. You will need to mark your work correct or incorrect. Incorrect or incomplete work is to be completed for the following class. Refer to the separate *Guidelines for Homework* handout for more information.

Homework is not group work. While you may work with other students to understand the material, your answers must be written up individually.

Computer Lab work. On Wednesdays there will be a computer lab session. Each lab, you will have a Data Desk worksheet to work through. Save your Data Desk file and copy any necessary graphs, tables or statistical summaries to a new page in your Teams Class Notebook, "Lab" section. Work is to be completed before the next class. Save your Data Desk files with appropriate file names in order to find your work easily at a later date.

Project/assignments. As part of the course, students will conduct a statistical analysis on a data set with different types of variables, producing relevant statistics and plots, using a statistical software package. By extension, students will be able to interpret the results obtained by any statistical software. Students will develop their group-working skills through these

projects.

The project will be completed in groups which will be decided in the first 2 weeks of class.

Final Examination: The final examination will consist of both written section as well as a computer part where students will work with Data Desk statistical software package on the computer. A student *must pass the final examination* (that is, obtain more than 50%) in order to pass the course.