



JOHN CABOT UNIVERSITY

COURSE CODE: "MA 492"
COURSE NAME: "Mathematical Statistics"
SEMESTER & YEAR: Fall 2021

SYLLABUS

INSTRUCTOR: Stefano Arnone
EMAIL: sarnone@johncabot.edu
HOURS: MW 6:00 PM 7:15 PM
TOTAL NO. OF CONTACT HOURS: 45
CREDITS:
PREREQUISITES: Prerequisites: MA 198, MA 208, MA 209; Recommended: MA 299
OFFICE HOURS: MW 2:15 to 3:00 pm by appointment

COURSE DESCRIPTION:

This is a calculus-based introduction to mathematical statistics. While the material covered is similar to that which might be found in an undergraduate course of statistics, the technical level is much more advanced, the quantity of material much larger, and the pace of delivery correspondingly faster. The course covers basic probability, random variables (continuous and discrete), the central limit theorem and statistical inference, including parameter estimation and hypothesis testing. It also provides a basic introduction to stochastic processes.

SUMMARY OF COURSE CONTENT:

The course covers basic probability theory as stemming from the axiomatic definition of probability; random variables (continuous and discrete); the central limit theorem and statistical inference, including parameter estimation. It also provides a basic introduction to stochastic processes.

LEARNING OUTCOMES:

Upon successful completion of the course, students will be able to apply the various techniques they learned in calculus to the field of Statistics. In particular, they will:

- understand the concepts of probability distributions and distribution functions;
- understand random variables and their distributions;
- understand the moments, joint moments and moment generating functions of the random variables;
- be able to derive the distributions of functions of random variables;
- be able to state and apply the Central Limit Theorem;
- understand simple stochastic processes.

TEXTBOOK:

Book Title	Author	Publisher	ISBN number	Library Call Number	Comments
Probability and Statistics, 4th edition	Morris H. DeGroot and Mark J. Schervish	Addison-Wesley Pearson	9780321500465		

REQUIRED RESERVED READING:

Book Title	Author	Publisher	ISBN number	Library Call Number	Comments
The Concepts and Practice of Mathematical Finance	Mark Joshi	Cambridge University Press	9780321500465		

RECOMMENDED RESERVED READING:

NONE

GRADING POLICY

-ASSESSMENT METHODS:

Assignment	Guidelines	Weight
Homework	Homework assignments will be graded: the average grade weighs 20 percent of the final grade. At the professor's discretion, late assignments might not be accepted.	20/100
Mid-term exam	The instructor reserves the right to ask students for clarification on any exercise on the exam to judge if the work they submitted is actually theirs.	35/100
Final exam (comprehensive)	The instructor reserves the right to ask students for clarification on any exercise on the exam to judge if the work they submitted is actually theirs.	45/100

-ASSESSMENT CRITERIA:

AWork of this quality directly addresses the question or problem raised and provides a coherent argument displaying an extensive knowledge of relevant information or content. The student demonstrates complete, accurate, and critical knowledge of all the topics, and is able to solve problems autonomously.

BThis is highly competent level of performance and directly addresses the question or problem raised. There is a demonstration of some ability to critically evaluate theory and concepts and relate them to practice. The work does not suffer from any major errors or omissions and provides evidence that the student uses clear logic in his/her arguments.

CThis is an acceptable level of performance and provides answers that are clear but limited, reflecting the information offered in the lectures. Mathematical statements are properly written most of the time.

DThis level of performance demonstrates that the student lacks a coherent grasp of the material. Important information is omitted and irrelevant points included. Many mistakes are made in solving the problem raised. In effect, the student has barely done enough to persuade the instructor that s/he should not fail.

FThis work fails to show any knowledge or understanding of the subject-matter. Most of the material in the answer is irrelevant.

-ATTENDANCE REQUIREMENTS:

ATTENDANCE REQUIREMENTS AND EXAMINATION POLICIES

Students who are not taking the course fully remotely are expected to come to class on a regular basis and to sit exams in the classroom. Indeed, **only those students who successfully petitioned for remote learning will be able to take exams remotely**. Coming late to class or leaving early will be possible only with permission of the instructor.

Major exams cannot be made up without the permission of the Dean's Office. The Dean's Office will grant such permission only when the absence was caused by a serious impediment, such as a documented illness, hospitalization or death in the immediate family (in which you must attend the funeral) or other situations of similar gravity. **Absences due to other meaningful conflicts, such as job interviews, family celebrations, travel difficulties, student misunderstandings or personal convenience, will not be excused.** Students who will be absent from a major exam must notify the Dean's Office prior to that exam. Absences from class due to the observance of a religious holiday will normally be excused. Individual students who will have to miss class to observe a religious holiday should notify the instructor by the end of the Add/Drop period to make prior arrangements for making up any work that will be missed.

The Instructor reserves the right to choose days and times for make-up exams that best fit his schedule, after consulting the student(s) involved.

ACADEMIC HONESTY

As stated in the university catalog, any student who commits an act of academic dishonesty will receive a failing grade on the work in which the dishonesty occurred. In addition, acts of academic dishonesty, irrespective of the weight of the assignment, may result in the student receiving a failing grade in the course. Instances of academic dishonesty will be reported to the Dean of Academic Affairs. A student who is reported twice for academic dishonesty is subject to summary dismissal from the University. In such a case, the Academic Council will then make a recommendation to the President, who will make the final decision.

STUDENTS WITH LEARNING OR OTHER DISABILITIES

John Cabot University does not discriminate on the basis of disability or handicap. Students with approved accommodations must inform their professors at the beginning of the term. Please see the website for the complete policy.

SCHEDULE

Session	Session Focus	Reading Assignment	Other Assignment	Meeting Place/Exam Dates
Week 1 and week 2	Review of Probability Theory	De Groot (DG), Chaps 1 and 2		
Week 3 to week 8	Random Variables and their probability distributions	DG, Chap. 3, sects 3.1 to 3.5 and 3.7 to 3.9 DG, Chap. 5, sects 5.5 to 5.7 DG, Chap. 8, sects 8.2 and 8.4		Week 7 or beginning of week 8: mid-term exam (Topics: probability theory and distributions of random variables)
Week 9 and 10	Expectation	DG, Chap. 4, sects 4.1 to 4.6		
Week 11	The Central Limit theorem	DG, Chap. 6		
Week 12	Estimation	DG, Chap. 7, sects 7.5 and 7.6		
Week 13 and 14	Stochastic processes and the Ito calculus	Joshi (J), Chap. 5, pp. 89 to 104		For date and time of final exam, please refer to the official final exam schedule.