

**THE UNIVERSITY OF THE WEST INDIES – MONA CAMPUS
DEPARTMENT OF ECONOMICS**

ECON3031: Probability & Distribution Theory

Academic Year:	Semester I - 2021/2022
Pre-requisite:	ECON2008 or STAT2001 and ECON1004 or MATH1142
Anti-requisite:	MATH2404
Lecturer:	Romae Muschette
Lecture:	Wednesdays 3:00PM - 5:00PM
Email:	romae.finegan@uwimona.edu.jm
Office Hours:	Mondays 6:00PM – 7:00PM & Thursdays 12:00PM – 1:00PM

Course Description

Uncertainties in economic and business activities must be evaluated and quantified for effective decision-making and policy creation. Probability and distribution theory have useful properties and characteristics that allow for these uncertainties to be measured. This course explores the basic concepts of this area and its practical applications in business and economics.

Learning Outcomes

At the end of this course, students should be able to:

1. Apply the properties of probability to derive needed probabilities
2. Identify different types of probabilities and probability distributions
3. Derive the characteristics of general and special probability distributions

Modes of Delivery

Two lecture hours and one tutorial hour per week via Blackboard Collaborate.

Syllabus

1. Introduction to Probability (chapter 2)

- Definitions of probability
- Axioms & Rules of Probability
- Marginal, Joint & Conditional Probability
- Bayes' Theorem

2. Probability Distribution & Probability Density Functions (chapter 3)

- Discrete Random Variables & their Probability Distributions
- Continuous Random Variables & their Probability Distributions
- Multivariate Random Variables
- Marginal & Conditional Distributions

3. Mathematical Expectation (chapter 4)

- Expected Values of Random Variables
- Moments & their Applications
- Moment Generating Functions

4. Special Distributions (chapters 5 & 6)

- Special Discrete Probability Distribution Functions
- Negative binomial
- Hypergeometric
- Special Continuous Probability Distribution Functions
- Gamma
- Beta

Assessment

To establish student understanding of the course material and encourage ongoing engagement in the course, several assessment strategies will be utilized throughout delivery of this course. The assessment summary is provided below:

Mode of Assessment	Format	Weight
Mid-Semester exam	Documented Problem Solving (DPS) Questions (Take-Home Exam) or Multiple-Choice Questions	30%
Course Work	Assigned DPS Questions or Multiple-Choice Questions	10%
Final Exam	DPS Questions or Multiple-Choice Questions	60%

Resources

Required Textbook:

- Miller, I., Miller, M., & Freund, J. E. (2014). John E. Freund's mathematical statistics with applications. Boston: Pearson.

Other Materials: Scientific Calculator

Pop Quizzes

Pop quizzes will be carried out at random during lecture hours. These pop quizzes are not graded; however, they will be used to award badges and trophies throughout the semester. Students are required to register through the link provided on the course page to participate in quizzes. Each student is required to register using the name on his/her UWI ID.

Tutorials

- STUDENTS ARE REQUIRED TO ATTEMPT ALL TUTORIAL QUESTIONS PRIOR TO THE TUTORIAL. Failure to do so will result in the tutorial ending prematurely and the tutor assuming that students are comfortable with the information contained therein. The role of the tutor is not to do the tutorial questions but to assist students through the tutorial questions. Therefore, an attempt must be made by students prior to the tutorial session.

Other Details

- Students are also required to know and be able to apply the rules of integration and differentiation as these techniques will be heavily utilised during the course.