



DE LA SALLE UNIVERSITY – MANILA
COLLEGE OF SCIENCE
Mathematics Department

SYLLABUS

COURSE CODE	MSS511M
COURSE TITLE	Introduction to Probability Theory
CLASS DAY & TIME	
ROOM	
NAME OF FACULTY	
COURSE CREDIT	3 Units
CONTACT NO. (DEPT)	(02) 536-0270, (02) 524-4611 loc. 420/413
TERM/SCHOOL YEAR	

COURSE DESCRIPTION

A course on mathematical probability with topics on probability and probability spaces, random variables and distribution functions, independence of random variables, expectation, convergence, laws of large numbers and characteristic functions.

COURSE OBJECTIVES

The students will:

1. properly define and basic concepts and state well – known results in elements probability theory;
2. demonstrate ability to determine various expectations of functions of random variables;
3. show the capability of calculating probabilities of events for a probability model and relating these to real-world applications;
4. identify distributions of special random variables.
5. Exhibit values like:
 - cooperation through group study;
 - honesty by claiming credit only for the work he has done;
 - zeal and seriousness of intent to learn by participating actively in class discussion, doing his homework regularly and consulting his mentor;
 - patience, perseverance and diligence by solving assigned exercises completely including the difficult ones;
 - faith by doing what is right and giving his best in performing any assigned task;
 - show concern for the community through sharing of know-how and resources during group discussion;
 - self-reliance by being able to solve problems independently.

Topic/Subtopic	Learning Strategies/ Activities	Week/Meeting
1. PROBABILITY SPACES 1.1 Random Experiments and Sample Spaces 1.2 Events and Classes of Sets 1.3 Probabilities and Probability Spaces 1.4 Probabilities 1.5 Conditional Probability	Lecture-Discussions Problem Solving Hands-on Exercises	5 Hours
QUIZ 1		
2. RANDOM VARIABLES 2.1 Fundamentals of Random Variables 2.2 Distributions and Distribution Functions 2.3 Density and Mass Functions 2.4 Common Families of Distributions 2.5 Exponential, Location and Scale Families 2.6 Transformation Theory: Distributions of Functions of Random Variables	Lecture-Discussions Problem Solving Hands-on Exercises	5 Hours
QUIZ 2		
3. INDEPENDENCE 3.1 Independent Random Variables 3.2 Functions of Independent Random Variables 3.3 Independent Events	Lecture-Discussions Problem Solving Hands-on Exercises	7 Hours
4. EXPECTATIONS 4.1 Basic Properties 4.2 Integrals with respect to Distribution Functions 4.3 Computation of Expectations 4.4 L_p Spaces and Inequalities 4.5 Moments	Lecture-Discussions Problem Solving Hands-on Exercises	7 Hours
QUIZ 3		
5. CONVERGENCE OF SEQUENCES OF RANDOM VARIABLES 5.1 Modes of Convergence 5.2 Relationships Among the Modes of Convergence 5.3 Convergence under Transformations	Lecture-Discussions Problem Solving Hands-on Exercises	7 Hours
6. CHARACTERISTIC FUNCTIONS 6.1 Basic Properties 6.2 Inversion and Uniqueness Theorems 6.3 Moments and Taylor Expansions 6.4 Continuity Theorems and Applications 6.5 Other Transforms	Lecture-Discussions Problem Solving Hands-on Exercises	5 hrs
7. LAWS OF LARGE NUMBERS 7.1 The Strong Law of Large Numbers 7.2 The Central Limit Theorem	Lecture-Discussions Problem Solving Hands-on Exercises	4 Hours
QUIZ 4		
FINAL EXAMINATION		2 Hours

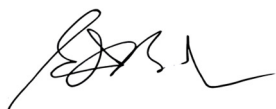
COURSE REQUIREMENTS

- ⑩ Quizzes and Long Exams
- ⑩ Final Examination
- ⑩ Problem Sets

SOURCES

- Bhat, B.R. (2009). *Modern Probability Theory, An Introductory Textbook*, 3/e. New Age International.
- Bickel and Doksum (2001). *Mathematical Statistics: Basic Ideas and Selected Topics*, 2/e. Prentice Hall.
- Billingsley, P. (1995). *Probability and Measure*, 3/e. John Wiley & Sons, New York.
- Karr, Allan F. (1993). *Probability*. Springer-Verlag, New York.
- Laha, R.E. and Rohatgi, V.K. (1979). *Probability Theory*. Wiley, New York.
- Rao, M.M. and Swift, R.J. (2006). *Probability Theory with Applications*, 2/e. Springer-Verlag, New York.
- Ross, Sheldon M. (2005). *A First Course in Probability*, 7/e. Prentice Hall.
- Roussas, G. (1997). *A First Course in Mathematical Statistics*, 2/e. Academic Press.
- Shorack, G.R. (2000). *Probability for Statisticians*. Springer-Verlag, New York.

Noted by:



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