STAT 110 Introductory Probability and Statistics

(3:30 – 4:45 PM on Mon & Wed at B115)

I. Instructor Information

Name	Dr. Bong-Sik Kim		
Office	C25	Email	bkim@aurak.ac.ae
Office Hours	10:00-11:30 AM on Sun & Tue or by appointment		

II. Class Description

Lecture	3 hours per week	Prerequisite	MATH 111
Course Web	AURAK Blackboard		

III. **Course Description:** This course is to introduce students to basics of probability theory and statistical inference with motivation, examples and applications in sciences. Standard topics from probability and statistics courses are covered, with particular emphasis on those areas connected with modeling such as stochastic processes, the concept of diffusion through a Markov chain describing the random behavior of an individual molecule, and the Poisson process.

IV. **Course Materials**
Textbook: Modeling the Dynamics of Life (3rd Ed), by Frederick R. Adler, Brooks/Cole, 2013.
- Four books are on reserve at the AURAK library
- E-book at https://www.vitalsource.com/ (eText ISBN: 9781285225975)

R: This is a programing language for statistical computing. Depending on course topics we might use 'R' for computational experiments. No previous experience is assumed. Basic instruction will be given in class, if needed

V. **Learning Outcomes**: Upon successful completion of the component ALL students will be able to
- Define discrete random variables and construct their probability distributions with histograms,
- Identify and use probabilistic methods, such as Markov chains and stochastic models, to describe and analyze biological and chemical process and questions,

- Demonstrate their understanding of the links between probability models (binomial, geometric, Poisson, and normal distributions) and the fundamental statistical notions of the expectation, median, mode, variance, and standard deviation.

VI. **Assessment:** Assignments (20%) + Three Exams (50%) + Final Exam (30%)
- **Assignments:** Assignments consist of homework on WeBWork, quizzes, and/or computational experiments with 'R'
  - You have to maintain 80% or more to get full mark in this category.
  - Attendance will be taken. If your attendance rate exceeds 10%, a course grade deduction that matches the attendance rate is applied.
- **Exams:** There will be three midterm exams. Lowest one exam will be dropped.
- **Final Exam** (TBA)
- **'R' Programming:** This is an open-sourced programming language. We will write programs using R to demonstrate mathematical concepts. No prior knowledge is required. Detail will be discussed in class.
- **Late and Makeup Policy:** Deadlines are deadlines. If you fail to submit an assignment, do a recitation, or take an exam on time, you get no points for that element. There are two important classes of exceptions to the rule above:
  - Unforeseeable emergencies. Examples might include severe illness, the death of a family member or close friend, a house fire, etc. In the case of an unforeseeable emergency, please talk to the instructor.
  - When you participate in official AURAK activities. Participation must inform the instructor in advance.

VII. **Grade Scale**

Letter Grade	Percentage (%)
A	90-100
A-	87-89
B+	84-86
B	80-83
B-	77-79
C+	74-76
C	70-73
C-	67-69
D+	64-66
D	60-63
F	Below 60

VIII. Course Contents
- ⚲ Chapter 6. PROBABILITY THEORY AND STATISTICS
  - 6.1 Introduction to Probabilistic Models
  - 6.2 Stochastic Models of Diffusion and Genetics
  - 6.3 Probability Theory
  - 6.4 Conditional Probability
  - 6.5 Independence and Markov Chains
  - 6.6 Displaying Probabilities
  - 6.7 Random Variables
  - 6.8 Descriptive Statistics
  - 6.9 Descriptive Statistics for Spread
- ⚲ Chapter 7. PROBABILITY MODELS
  - 7.1 Joint Distributions
  - 7.2 Covariance and Correlation
  - 7.3 Sums and Products of Random Variables
  - 7.4 The Binomial Distribution
  - 7.5 Applications of the Binomial Distribution
  - 7.6 Exponential Distributions
  - 7.7 The Poisson Distribution
  - 7.8 The Normal Distribution
  - 7.9 Applying the Normal Approximation

IX. Academic Integrity

Academic standards will be strictly adhered to as outlined in your student handbook. This means that cheating will not be tolerated. Looking at another student's exam or quiz (whether or not you mean to copy answers) while taking it will be considered cheating. Students caught cheating will fail the exam or quiz, and the incident will be referred to the Vice President for Academic Affairs and Student Success, as outlined in your Student Handbook 2017-2018 (pages 25-26)

X.   Student Code of Conduct (Student Handbook 2017-2018, pages 22-24)

As a courtesy to me and your fellow classmates, please silence your cell phone and refrain from using any kind of electronic device during class.