THE UNIVERSITY OF TEXAS AT EL PASO – COLLEGE OF ENGINEERING
DEPARTMENT OF INDUSTRIAL, MANUFACTURING, AND SYSTEMS ENGINEERING

IE 4390 Probabilistic Operations Research

1. **Course number and name**: IE 4390 Probabilistic Operations Research
2. **Credits and contact hours:** 3 credits – 2 lectures per week - 1.5 hours per lecture
3. **Instructor's or course coordinator's name:** Dr. Francisco Oswaldo Aguirre
4. **Text book, title, author, and year**: Introduction to Probability Models; Wayne L. Winston; 4th edition
    a. **other supplemental materials:**
    reference books:
        1. An Introduction to Queuing Theory: Modeling and Analysis in Applications, Narayan Bhat
        2. Fundamentals of Queuing Theory, 4th edition, Donald Gross, Wiley
        3. The Art of Computer systems performance analysis: Techniques for Experimental design, Measurement, Simulation, and modeling, 1th edition, Raj Jain, Wiley
        4. Understanding Markov Chains: Examples and Applications, Nicolas Privault, Springer

    b. software: MATLAB (available on my.apps.utep.edu)

5. **Specific course information**
    a. brief description of the content of the course (catalog description):
    Spring 2018 UTEP catalog description:
    An introduction to probabilistic optimization that involve stochastic processes. The course will introduce the student to a variety of probabilistic systems that involve randomness and the techniques used to manage these complex system scheduling and basic Markov processes. The main topic covered include basic probability concepts, Markov chain processes, queuing systems, and game theory techniques.
    b. prerequisites or co-requisites: IE 3373 with a grade of "C" or better.
    c. indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program: Required course.

6. **Specific goals for the course**
    a. specific outcomes of instruction:
    - Students will understand the importance of randomness in real life engineering system
    - Students will develop techniques to make decisions under uncertainty
    - Students will learn the basics of Markov systems and how to apply it to solve engineering problems.
    - Students will learn the most common queuing system
    - Students will understand the fundamentals of game theory.

b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course:

Student Outcomes						
1	2	3	4	5	6	7
X					X	

7. Brief list of topics to be covered

Probability models, Bayes theorem, Poison processes, Markov chains, death and birth death process, queuing theory.