

IE 342 – PROBABILITY AND STATISTICS FOR ENGINEERS

*Designation as a 'Required' or 'Elective' course*

TYPE OF COURSE: Required for BSIE Major

*Course (catalog) description*

COURSE DESCRIPTION: IE 342 Probability and Statistics for Engineers, 3 Hours. Probability, random variables, mathematical expectation, discrete and continuous distributions, estimation theory, test of hypotheses, and introduction to standard experimental design.

*Prerequisite(s)*

PREREQUISITE(S): Math 181 Calculus II, 5 Hours

*Textbook(s) and/or other required material*

SAMPLE SOURCES AND RESOURCE MATERIALS: Probability and Statistics for Engineers and Scientists, by Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers and Keying E. Ye, 9<sup>th</sup> Ed., Prentice Hall, 2011.

*Course objectives*

COURSE OBJECTIVES: This course introduces students to various aspects of statistical analysis. The objective is to expose the students to elements of probability and probability distributions, and statistical inference. We try to keep a balance between theory (topics 1 to 5) and methodology (topics 6, 7 and 8). The students use differential and integral calculus to investigate different properties of random variables and their functions. They also learn how to apply statistical analysis to solve real-life problems. Many examples are used to show the applicability of the probability theory and statistical analysis.

*Topics covered*

MAJOR TOPICS:		Hrs
1	Probability	8
2	Random variables and probability distributions	5
3	Mathematical expectation	5
4	Discrete probability distributions	5
5	Continuous probability distributions	5
6	Random sampling and sampling distributions	5
7	Estimation theory	4
8	Test of hypotheses	4
9	Class quizzes	2
10	Final exam	
Total		43

*Class/laboratory schedule, i.e., number of sessions each week and duration of each session*

CREDIT HOURS: 3 hours

TYPE OF INSTRUCTION: Contact Hours/Week

Type of Instruction 3 Hrs

Lecture/Discussion

<b>Outcomes</b>		<b>Comments on outcomes</b>
A	Ability to apply knowledge of mathematics, science and engineering.	Students are able to use mathematical calculations in solving engineering problems. Also, students are able to formulate engineering problems based on scientific and engineering principles. Much of the course deals with the statistical aspects of data.
B	An ability to design and conduct experiments, as well as to analyze and interpret data.	Ability to analyze, interpret and determine significant parameters to aid in understanding data. Also, students develop the ability to analyze, interpret and determine significant parameters to aid in understanding data.
E	An ability to identify, formulate, and solve engineering problems.	Students develop the ability to understand what is needed, formulate problems mathematically and build on fundamental knowledge and apply it to new situations through completing homework assignments.
K	Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	Illustrate knowledge of computer usage in engineering analysis. Some homework requires use of computers. The students can use Microsoft Excel or any other statistical software in their projects. Extra sessions will be held (if necessary) to demonstrate the software.

*Person(s) who prepared this description and date of preparation*

Professor Nan Ratisoontorn, Assistant Professor of Industrial Engineering, August, 2013

These outcomes are what students are expected to gain from this course.