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| Module Title: | Probability & Statistics for Engineers |
| Module ID: | STAT 324 |
| Prerequisite: | None |
| Level: | 4 |
| Credit Hours: | 3 (3+0+1) |

Module Description:

Introduction to Statistics & Data Analysis, Sample Space, Events, Counting Sample Points , Additive Rules., Conditional Probability, Independent Events, Multiplicative Rules, Bayes Rule, Concept of Random Variable, Discrete Probability Distributions, Continuous Probability Distributions, Sampling distribution of the mean, Introduction to Estimation, Statistical Inference, Estimating the Mean, Standard Error. Estimating the Difference Between Two Means, Estimating a Proportion, Estimating the Difference between Two Proportions, Statistical Hypotheses, Testing a Statistical Hypothesis., One- and Two-Tailed Tests, Tests Concerning a Single Mean, Tests on a Single Mean when variance is unknown, Tests on Two Means, Test on a Single Proportion, Test on two Proportions.

Module Aims:

- Know the basic axioms and set theory upon which probability theory is based including sample spaces and events, mutual exclusivity, conditional probability, Bayes theorem..
- Understand the concept of random variables and probability, sampling distributions.
- Know various well-known distributions and how they are used in practice.
- Identify common errors in sampling and experimenting

- Understanding inference statistic and theory of estimation

Learning Outcomes:

- The student recognizes the principles of the theory of distribution.
- The student recognizes the theory of estimation.
- The student should be able to use these principles in the solving problems.
- The student recognizes the hypothesis testing and how it is used in applications.
- The ability to know the concept of theory of estimation.
- The development of the student's ability to use the test of hypothesis.
- The development of the student's ability to apply these concepts to solve applications

| List of Topics | No. of Weeks | Contact Hours |
|---|--------------|---------------|
| Introduction to Statistics & Data Analysis | 1 | 3 |
| Sample Space, Events, Counting Sample Points , Additive Rules. | 1 | 3 |
| Conditional Probability, Independent Events, Multiplicative Rules, Bayes Rule. | 1 | 3 |
| Concept of Random Variable, Discrete Probability Distributions, Continuous Probability Distributions. | 1 | 3 |
| Sampling distribution of the mean. | 1 | 3 |
| Discrete Uniform Distribution, Binomial Distribution, Poisson Distribution. | 1 | 3 |
| Revision and Test 1 | 1 | 3 |

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| Continuous Uniform Distribution, Normal Distribution. | 1 | 3 |
| Exponential Distribution, Random Sampling, Sampling Distribution of Means, t-Distribution | 1 | 3 |
| Introduction to Estimation, Statistical Inference, Estimating the Mean, Standard Error. | 1 | 3 |
| Estimating the Difference Between Two Means, Estimating a Proportion, Estimating the Difference between Two Proportions. | 1 | 3 |
| Statistical Hypotheses, Testing a Statistical Hypothesis. | 1 | 3 |
| Revision and Test2 | 1 | 3 |
| One- and Two-Tailed Tests, Tests Concerning a Single Mean, Tests on a Single Mean when variance is unknown | 1 | 3 |
| Tests on Two Means, Test on a Single Proportion, Test on two Proportions. | 1 | 3 |

Textbook:

Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers and Keying E. Ye,
 “Probability and Statistics for Engineers and Scientists”, Pearson; 9 edition