

<b>Course Title</b>	<b>Probability and Statistics</b>		
<b>Course Code</b>	<b>MS-251-N1</b>		
<b>Credit Hours</b>	3 (3,0)		
<b>Category</b>	Mathematics & Supporting		
<b>Prerequisite</b>	None		
<b>Co-Requisite</b>	None		
<b>Follow-up</b>	None		
<b>Course Learning Outcomes (CLOs)</b>	At the end of the course, the students will be able to:	<b>BT</b>	<b>PLO</b>
	CLO1: Know the concept and applications of probability and statistics.	C1 (Know)	1
	CLO2: Describe expectation and distributions	C2 (Describe)	1
	CLO3: Solve single sample and one- and two- sample estimation.	C3 (Apply)	1,3
	CLO4: Use regression techniques.	C3 (Apply)	1,3
<b>Syllabus</b>	<p><b>Introduction:</b> Statistics and Data Analysis, Statistical Inference, Samples, Populations, and the Role of Probability. Sampling Procedures, Discrete and Continuous Data, Statistical Modeling, Types of Statistical Studies. <b>Probability:</b> Sample Space, Events, Counting Sample Points, Probability of an Event, Additive Rules, Conditional Probability, Independence, and the Product Rule, Bayes' Rule. Random Variables and Probability Distributions. <b>Mathematical Expectation:</b> Mean of a Random Variable, Variance and Covariance of Random Variables, Means and Variances of Linear Combinations of Random Variables, Chebyshev's Theorem. <b>Probability Distributions:</b> Discrete Probability Distributions, Continuous Probability Distributions. <b>Fundamental Sampling Distributions:</b> Sampling Distributions and Data Descriptions, Random Sampling, Sampling Distributions, Sampling Distribution of Means and the Central Limit Theorem. Sampling Distribution of <math>S^2</math>, t-Distribution, F-Quantile and Probability Plots. <b>Single Sample &amp; One- and Two-Sample Estimation Problems:</b> Single Sample &amp; One- and Two-Sample Tests of Hypotheses. The Use of P-Values for Decision Making in Testing Hypotheses (Single Sample &amp; One- and Two-Sample Tests). <b>Regression:</b> Linear Regression and Correlation, Least Squares and the Fitted Model, Multiple Linear Regression and Certain, Nonlinear Regression Models, Linear Regression Model Using Matrices, Properties of the Least Squares Estimators.</p>		
<b>Suggested Instructional/ Reading Material</b>	<ol style="list-style-type: none"> <li>1. Dimitri P. Bertsekas, John Tsitsiklis, Introduction to probability, Athena Scientific, 2<sup>nd</sup> Edition, 2008, ISBN: 978-1886529236.</li> <li>2. Jay L. Devore, Probability and Statistics for Engineering and the Sciences, Cengage Learning, 9<sup>th</sup> Edition, 2015, ISBN: 978-1305251809.</li> <li>3. R.E. Walpole, R.H. Myers and S.L Myers, "Probability and Statistics for Engineers and Scientists", 9<sup>th</sup> Edition.</li> <li>4. MIT open courseware: <a href="https://ocw.mit.edu/courses/mathematics/18-05-introduction-to-probability-and-statistics-spring-2014/">https://ocw.mit.edu/courses/mathematics/18-05-introduction-to-probability-and-statistics-spring-2014/</a></li> </ol>		