Course Title	Probability and Statistics				
Course Code	MAT225				
Course Type	Compulsory				
Level	Bachelor (1st Cycle)				
Year / Semester	2nd Year / 4th Semester				
Teacher's Name	TBA				
ECTS	6	Lectures / week	3 hours / 14 weeks	Laboratories / week	N/A
Course Purpose and Objectives	This course provides the engineer a good knowledge of applications of statistics and probability theory. Modelling real life problems using probability models as well as presenting ways of processing and analyzing data using statistical techniques are central to this course.				
Learning Outcomes	• Appropriately use tabular and graphical methods of analyzing and presenting qualitative and quantitative data • Construct, interpret, and use numerical measures of location and variability for the sample and the population • Apply basic probability concepts in decision-making • Describe the properties of the Binomial, Poisson and Normal distributions, and apply the concepts of expected value and variance of a probability distribution to a variety of business applications • Construct and interpret interval estimates for a population mean and proportion • Calculate and interpret statistical decisions from hypothesis testing for the mean and proportion of one population • Use Markov Chain techniques to model and further analyze problems				
Prerequisites	MAT160, MAT200	Co-requisites	None		
Course Content	Graphical Representation of Data: Bar Chart, Histogram, Frequency Polygon. Statistical Measures: Measures of Central Tendency (Mean, Median, Mode), Measures of Variability (Standard Deviation, Variance, Range). Probability: Sample Space, Event, Probability of an Event, Laws of Probability, Conditional Probability, Bayes' Theorem.				

	Counting Methods: Permutations, Combinations, Relations between Permutations and Combinations, Applications. Random Variables: Concept of a Random Variable, Expectation, Variance, Discrete Probability Distributions (Binomial Distribution, Poisson Distribution), Continuous Probability Distributions (Uniform Distribution, Normal Distribution). Markov Chains: Transition function, Transition Matrix (for Markov Chains with Finite Number of States), Stationary Distributions, Steady State Distributions. Confidence Intervals: Point Estimation of the Mean, Confidence Intervals for the Population Mean for Large Samples, Confidence Intervals for the Population Mean for Small Samples, t-distribution, Confidence Intervals for Proportions. Hypothesis Testing: Hypothesis Testing for the Mean of One Population for Large and Small Samples, The Null and Alternative Hypothesis, The t-test, Degrees of Freedom, Applications.
Teaching Methodology	Face – to – face
Bibliography	Johnson, R.A., PROBABILITY AND STATISTICS FOR ENGINEERS, Prentice Hall (latest edition) Hoel P.G., Port S.C., Stone C.J., INTRODUCTION TO STOCHASTIC PROCESSES, Houghton Mifflin Company (latest edition) Volk, W., APPLIED STATISTICS FOR ENGINEERS, McGraw Hill (latest edition) Walpole, R.E. & Mayers R.H., PROBABILITY AND STATISTICS FOR ENGINEERS AND SCIENTISTS, Macmillan (latest edition) Strait, P., PROBABILITY AND STATISTICS WITH APPLICATIONS, Harcourt Brace Juvanovich (latest edition) De Groot, M.H., PROBABILITY AND STATISTICS, Wesley (latest edition) Bain, L.T. & Engelhardt, M., PROBABILITY AND MATHEMATICAL STATISTICS, Thomson (latest edition)

Assessment	Examinations 90% Class Participation and Attendance 10% 100%
Language	English