

CURRICULUM GUIDE: OFFICIAL COURSE OUTLINE

Course Code	STAT 270	Course Title	Introduction to Probability and Statistics			
Credit Value	3	Department	Mathematics and Science			
No. of weeks	14	Hrs. per week	<i>Lecture</i>	<i>Tutorial</i>	<i>Laboratory</i>	<i>Total</i>
			4	0	0	4
Course Description	This is a calculus-based introductory statistics course which provides a comprehensive introduction to statistics, the science of data. It is intended for students who have experience with calculus. Topics include: an introduction to probability; discrete and continuous random variables and their probability distributions; joint distributions; expectation; sampling distributions; central limit theorem; confidence intervals and hypothesis testing; correlation and linear regression.					
Prerequisite(s)	ENGL 098, MATH 152 or MATH 105 (C)					
Initial Articulation Targets	<i>UBC</i>	<i>SFU</i>	<i>UVic</i>	<i>UNBC</i>	<i>TRU</i>	
	STAT 241 (3)	STAT 270 (3) – Q	STAT 260 (1.5)	STAT 371 (3)	STAT 2230 (3)	
	For updated information on the transferability of this course, please consult the BC Transfer Guide, www.bctransferguide.ca					
Learning Outcomes	<p>Upon successful completion of this course, the student will be able to:</p> <ul style="list-style-type: none"> • Construct informative graphical and numerical summaries of data appropriate for the type of data and the context in which it was collected and interpret these summaries appropriately in the context. • Compute simple conditional probability and use Bayes' Theorem to analyze posterior probability. • Understand the concept of a random variable; recognize standard probability distributions and be able to calculate probabilities for a variety of discrete and continuous random variables. • Identify parameters in probability distributions according to models like binomial, hypergeometric, negative binomial, and Poisson. • Calculate expected value, variance, covariance, and correlation for probability distributions as appropriate. • Interpret and apply the Central Limit Theorem to solve problems. • Compute and interpret confidence intervals and hypothesis tests • Analyze the simple linear regression model through confidence interval building of parameters, hypothesis testing of the slope parameter, or model utility test. 					



	<ul style="list-style-type: none"> • Employ correct mathematical and statistical notation and terminology including the appropriate use of technology (e.g., statistical calculator, statistical software program, etc.) in solving the problem and presenting solutions and results.
Content	<p>Core topics – all of the following will be covered:</p> <ul style="list-style-type: none"> • Descriptive statistics (overview of descriptive statistics including pictorial and tabular methods, measures of location, and measures of variability) • Probability (sample spaces and events, axioms, counting rules, conditional probability, independence, Bayes Theorem) • Discrete distributions (random variables, probability distributions for discrete random variables, expected values, the binomial distribution, and the Poisson distribution) • Continuous distributions (probability density functions, cumulative distribution functions, and expected values, the normal distribution, the exponential and Gamma distributions) • Joint probability distributions (jointly distributed random variables, expected values, covariance and correlation, statistics and their distributions, the Central Limit Theorem) • Statistical intervals based on a simple sample (basic properties of confidence intervals, large-sample confidence intervals, normal population distribution) • Tests of hypotheses based on a single sample (hypotheses and test procedures, z- tests for hypotheses about a population mean, the one-sample t-test) • Inferences based on two samples (z -tests and confidence intervals for a difference between two population means, the two-sample t-test, analysis of paired data) • The analysis of variance (single-factor ANOVA, and multiple comparisons in ANOVA) • The simple linear regression model and correlation. <p>Additional topics may also be covered, at the discretion of the instructor.</p>
Methods of Instruction	Lectures, tutorials, assignments, in-class activities
Required Textbook(s)	<p>The following textbook(s) is/are required, or approved equivalent(s).</p> <p>One of the following:</p> <p>Devore, J. L. (2016). <i>Probability and Statistics for Engineering and the Sciences</i>. Boston, MA : Cengage Learning</p> <p>Hayter, A. J. (2013). <i>Probability and Statistics for Engineers and Scientists</i>. Toronto: Nelson Education.</p> <p>Walpole, R. E., Myers, R. H., Myers, S. L., & Ye, K. (2017). <i>Probability & Statistics for Engineers & Scientists</i>. Singapore: Pearson Education South Asia Pte.</p>



Required Equipment and Technology	<p>Students are required to have a computer with internet access.</p> <p>The following resources are provided by the College:</p> <ul style="list-style-type: none"> • Office 365 • Student email 		
Homework Hours	At minimum, students can expect one hour of homework for every hour of instructional time.		
Evaluation	<i>Component</i>	<i>% Value</i>	
	Assignments	5-20%	
	In-class activities and/or projects	5-20%	
	Quizzes	10-25%	
	Term examination(s)	20-30%	
Final examination	25-35%		
Completion Requirements	The minimum grade to pass this course is D (50%). Unless otherwise stated, a minimum grade of C- (55%) is required for this course to fulfil a prerequisite.		
Course Designer(s)	Krishna Subedi, Ph.D., Alexander College Faculty	Consultant(s), if applicable	Michael Monogan, Ph.D., Simon Fraser University Prince John, Ph.D., Alexander College Faculty
Dean's Approval	Barbara Moon, Ph.D., Dean of Arts and Sciences, Alexander College	Dean's Approval Date	February 17, 2021
Curriculum Committee Approval Date	February 17, 2021	First Term Offered	Fall 2021
Last Review Date	February 17, 2021	Next Review Date	February 7, 2026
Revision History			