

**STAT 321**

**Introduction to Probability**

(see Course Descriptions under the year applicable: <http://www.ucalgary.ca/pubs/calendar/> )

*Syllabus*

<u>Topics</u>	<u>Number of hours</u>
<b>Elements of probabilistic modeling.</b> Set theory. Sample spaces, probabilities and conditional probabilities. Basic probability computation techniques: Counting methods, multiplication rule and the law of total probabilities, Bayes rule.	5
<b>Discrete Random variables.</b> Probability mass functions, probability computations involving a discrete random variable, expectation, variance, functions of a discrete random variable, common discrete distributions: Bernoulli, binomial, geometric, Poisson, negative binomial, moments and moment generating function.	8
<b>Continuous random variables.</b> Cumulative distribution function (c.d.f), probability density function (p.d.f), probability computations involving a continuous random variable, expectation and variance, functions of a continuous random variable, common continuous distributions: uniform, normal distribution, exponential, gamma, beta. Moment generating functions.	9
<b>Multivariate random variables.</b> Marginal distribution functions, joint distribution functions, conditional probability distributions, covariance and its properties, independence of random variables, functions of multivariate random variables, linear functions of random variables, conditional expectation	11
<b>Central Limit Theorem.</b> The statement and proof of central limit theorem. Applications to the analysis of the sample mean of independent and identically distributed random variables.	3
<b>TOTAL HOURS</b>	<b>36</b>

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