Knowledge Mapping Form

Relevant to Computing Science and Statistics

Competitive students should have a minimum several dedicated computer science courses and several different dedicated statistics courses. List up to 8 of your most advanced, relevant courses in computer science and up to 8 of your most advanced, relevant courses in statistics that can be identified on your transcript. The nature of the course must heavily focus on topics in each discipline and be obvious from the title. Courses that do not appear to heavily cover topics in the discipline will be viewed unfavourably by the admissions committee. See the admissions page for details.

Course code	Course name	Mark
		Computer Science
		Statistics

Knowledge Mapping Form

Prerequisites

Identify in the first column which course(s) on your transcript ***heavily covered in depth*** the listed corresponding prerequisite knowledge for admission, and on the next page, advanced courses. If it is not obvious to the admissions committee by the title of the course, the committee will pass over the application unless clarifying information is provided (e.g., official course outline or explanation in personal statement). Courses that only touch on the content in the Knowledge Mapping will be viewed unfavorably by the committee and should be omitted. You may also indicate if these specific topics are very clearly discussed in your personal statement. See the admissions page for details.

Course(s) on applicant transcript or specific experience (outlined in statement)	**Prerequisite courses for admission**
	Multivariable Calculus: (*equivalent to TRU Math 2110: Calculus 3*)
	• Multivariable derivatives • Multivariable integrals • Vector approach: gradients, Hessian matrix
	Linear Algebra: (*equivalent to TRU Math 2120: Linear Algebra*)
	• Vector space proofs • Matrix inversion theorems • Diagonalization/decompositions • Orthogonalization and projections • Solving matrix equations
	Computing Science: (*equivalent to TRU COMP 1230: Computer Programming II*)
	• Basic methods of representing data in CS • Implement and analyze fundamental data structures, e.g., lists, stacks, queues, and graphs • Implementation of algorithms using data structures • Cost trade-offs of each of data type • Basic programming
	Introductory Statistics: (*equivalent to STAT 2000: Probability and Statistics*)
	• Basic descriptive statistics • Central tendency • Basic probability concepts • Expectation, variance • Inference basics including hypothesis testing and confidence intervals • Introduction to regression • Introduction to sampling and experimental design

Knowledge Mapping Form

Advanced courses

Instructions for prerequisites apply here.

Course(s) on applicant transcript or specific experience (outlined in statement)	**Desirable knowledge and skills**
	Database topics:
	• Database design techniques, using entity relationship model and object-oriented approach to designing database systems • Data description language, data manipulation language (updates, queries, reports), and data integrity • Experience with SQL
	Algorithms:
	• Asymptotic (and other) analysis of algorithms • Computational complexity • Identify and design algorithm patterns, e.g., search, sorting, divide & conquer, greedy, parallel
	Artificial Intelligence:
	• Knowledge representation • Problem solving, planning, learning • Any of the following topics: machine learning, neural networks, soft computing, computer vision, expert systems, computational linguistics, bioinformatics, modelling and simulation
	Scripting skills:
	• String manipulation • Working in a shell • Working with APIs
	Probability:
	• Total variance, double expectation, moment generating functions • derivations of common distributions (e.g., Poisson, t-, chi-square, gamma distribution)
	Regression:
	• Matrix and differential solutions to least squares (simple and multiple linear regression) • Model diagnostics, model selection
	Inference:
	• Theory and applications of various test statistic and confidence interval construction • Maximum likelihood topics • Bayesian methods including derivations • Likelihood ratio tests (including proofs) • Proof of the Central Limit Theorem