MSc Data Science Knowledge Mapping Form

To be successful in the Data Science program, one needs to have knowledge from three pillars, namely Mathematics, Statistics and Computing Science, as well as domain knowledge. This is an opportunity for you to list your experience in the above-mentioned areas. For more information on knowledge preparation for this program, kindly visit the following link: https://www.tru.ca/science/masters-degrees/mscds/admission/knowledge-preparation.html

Important: If you wish to update or make any changes to your Knowledge Mapping form after submitting it, please re-submit a new form including any changes. In this case, your previous response will be discarded and will not be reviewed. If we receive multiple responses from you, only your latest submission will be considered.

*Required

All information regarding coursework must match transcripts

I understand that if the information I provide on these forms does not match the information provided on my transcripts, my application may be discarded with no refund and no appeal.

1. Acknowledgement*

- Yes
- No

Personal Information - Enter your personal details

2. What is your full name? *

3. What is your TRU-ID? *
Please enter your 9-digit TRU-ID starting with T00.... Example: T00711111.

Important: Any forms submitted with an incorrect TRU-ID will **not** be reviewed.

4. Select your bachelor's degree below*
If your degree is not listed, please select 'other' and enter your bachelor's degree in the next question.

5. Enter any additional post-secondary qualifications you have earned. (*if any)*

6. List any applicable specializations

7. Non-Academic Qualifications

Relevance 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 unfavorably by the admissions committee.

List the course numbers, names, and grades obtained below. Please see below for the exact formatting we expect (Enter only one course per line. Use Alt+Ent to move to the next line).

Important: If your answer is not clear and as per the mentioned format, it may not be reviewed.

8. Computing Science (see example below)

COMP 1130 ; Computer Programming I ; A
COMP 1230 ; Computer Programming II ; A-
COMP 2230 ; Data Structures and Algorithm Analysis ; A

9. Statistics (see example below)

STAT 1200 ; Introduction to Statistics ; B
STAT 2000 ; Probability and Statistics ; A-
STAT 3060 ; Applied Regression Analysis ; A

Prerequisites

List **only the course numbers** on your transcript that heavily covered in depth the corresponding prerequisite knowledge for admission. Please separate each course code with a comma. 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).

Example: DASC 5410, DASC 6820

10. Multivariable Calculus (*equivalent to TRU MATH 2110: Calculus 3)*

- Multivariable derivatives
- Multivariable integrals
- Vector approach: gradients, Hessian matrix

11. Linear Algebra (*equivalent to TRU MATH 2120: Linear Algebra)*

- Vector space proofs
- Matrix inversion theorems
- Diagonalization/decompositions
- Orthogonalization and projections
- Solving matrix equations

12. Computer 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 data type
- Basic programming

13. Introductory Statistics (*equivalent to TRU 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

Advanced Courses

List **only the course numbers** on your transcript that heavily covered in depth the corresponding advanced knowledge for admission. Please separate each course code with a comma. 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).

Example: DASC 5410, DASC 6820

14. 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

15. Algorithms

- Asymptotic (and other) analysis of algorithms
- Computational complexity
- Identify and design algorithm patterns, e.g., search, sorting, divide & conquer, greedy, parallel

16. Artificial Intelligence

- Knowledge representation
- Problem solving, planning, and learning.
- Any of the following topics: machine learning, neural networks, soft computing, computer vision, expert systems, computational linguistics, bioinformatics, modelling, and simulation

17. Scripting skills

- String manipulation
- Working in a shell
- Working with APIs

18. Probability

- Total variance, double expectation, moment generating functions.
- Derivations of common distributions (e.g., Poisson t-, chi-square, gamma distribution)

19. Regression

- Matrix and differential solutions to least squares (simple and multiple linear regression)
- Model diagnostics, model selection

20. 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