COURSE LISTING – WINTER 2024

Course	Course Name	Professor	Schedule	Location
CP8201	**Advanced Algorithms**	Dr. M. Soutchanski	**Friday** **10:00 - 13:00**	**POD370**
CP8202	**Advanced Software Engineering**	Dr. O. Falou	**Monday** **15:00 - 18:00**	**KHE117**
CP8204	**Advanced Programming Languages**	A. Ufkes	**Wednesday** **12:00 - 14:00** **Friday** **08:00 - 09:00**	**DSQ02** **DSQ03**
CP8210	**Topics in Data Science**	Dr. A. Abhari	**Tuesday** **10:00 - 12:00** **Wednesday** **10:00 - 11:00**	**DSQ09** **DSQ10**
CP8310*	**Directed Studies in Computer Science**	**N/A**	**N/A**	**N/A**
CP8312*	**Directed Studies: Intelligence and Robotics**	**N/A**	**N/A**	**N/A**
CP8313*	**Directed Studies: Networks**	**N/A**	**N/A**	**N/A**
CP8314	**Advanced Artificial Intelligence**	Dr. M. Soutchanski	**Thursday** **14:00 - 16:00** **Tuesday** **13:00 - 14:00**	**EPH207** **EPH142**
CP8323	**Advanced Natural Language Processing**	Dr. V. Hu	**Monday** **08:00 - 11:00**	**CAR05**
CP8326	**Heuristic Search**	Dr. R. Valenzano	**Monday** **12:00 - 15:00**	**VIC301**
CP9101*	**Method of Instruction**	Dr. J. Tran	**Tuesday** **15:00 - 18:00**	**SHE652**
CP9102*	**Doctoral Seminar**	Dr. D. Mason	**Thursday** **10:00 - 11:00**	**ENG102**

* Requires a Directed Studies / Restricted Courses Request Form for enrollment, available at https://www.torontomu.ca/cs/graduate/forms-guidelines/

Notes:
1. Winter classes begin Friday, January 12, 2024.
2. Refer to the Significant Dates for course ADD and DROP deadlines:
https://www.torontomu.ca/graduate/calendar/significant-dates/
3. See the Graduate Calendar for Program Curriculum and Course Descriptions:
https://www.torontomu.ca/graduate/calendar/programs-and-courses/

COURSE DESCRIPTIONS

CP8201 Advanced Algorithms
This course covers advanced methods of algorithmic design and analysis with focus on efficiency and correctness of algorithms. The course reviews several popular algorithm design techniques and selected well-known algorithms. The final parts of the course include introduction to practical algorithms for computationally challenging problems, using heuristics, approximation algorithms and introduction to randomization algorithms. 1 Credit

CP8202 Advanced Software Engineering
Modern approaches to software development are studied including requirements analysis, system design techniques, formal description techniques, implementation, testing, debugging, metrics, human factors, quality assurance, cost estimation, maintenance, and tools. 1 Credit

CP8204 Advanced Programming Languages
A study of the principles, concepts, and mechanisms of computer programming languages - their syntax, semantics, and pragmatics; the processing and interpretation of computer programs; programming paradigms; and language design. Additional topics will include language design principles and models of language implementation. 1 Credit

CP8210 Topics in Data Science
This course presents concepts related to data science research activities including data management and analytics, data modeling, structured and unstructured data, regression models, social data analysis, web and data mining, information retrieval, text analysis and natural language processing. 1 Credit

CP8310 Directed Studies in Computer Science
This course is for Master's students who wish to gain knowledge in a specific area for which no graduate level classes are offered. Students wishing to take the class would be assigned a suitable class advisor most familiar with the specific area of interest. Students are required to present the work of one term (not less than 90 hours in the form of directed research, tutorials and individual study) in an organized format. 1 Credit
Not available to Course option students. Only one of CP8310 and CP8215 may be taken for credit toward degree completion.

CP8312 Directed Studies: Intelligence and Robotics
This course explores theoretical, practical and experimental (if applicable) problems in great depth in the areas of intelligence and robotics with emphasis on the aspects of Intelligence and Robotics and their application related to the discipline of Computer Science. Doctoral students must present their findings in a formal report. 1 Credit.

CP8313 Directed Studies: Networks
This course explores theoretical, practical and experimental (if applicable) problems in great depth in areas of computer and communication networks with emphasis on the aspects of computer networking and its application related to the discipline of Computer Science. Doctoral students must present the findings in a formal report. 1 Credit

CP8314 Advanced Artificial Intelligence
The course will focus on the theory and implementation of dynamical systems from the perspective of artificial intelligence. The

emphasis will be on the compromises involved in providing useful logical representations that allow reasoning about actions to remain tractable. The course will show how these research issues are relevant for many applications beyond the traditional area of artificial intelligence. 1 Credit

CP8323 **Advanced Natural Language Processing**
This course introduces students to the topics of Advanced Natural Language Processing. Topics include: introduction to NLP, statistics review, information extraction, annotating data, lexical semantics, text clustering, text classification, sentiment analysis, question answering, deep learning models and model interpretability. 1 Credit

CP8326 **Heuristic Search**
Heuristic search is a popular Artificial Intelligence method used in a variety of applications including robotics, combinatorial optimization, route pathfinding, and automated planning. In this course, we will investigate algorithms for solving search problems, and consider methods for automatically generating heuristic functions. Topics will include optimal and suboptimal search algorithms, abstraction and graph embedding-based heuristic generation methods, and Monte Carlo Tree Search. 1 Credit

CP9101 **Method of Instruction**
Students will learn to select appropriate teaching methods; establish goals and performance objectives and construct lesson plans. Students will be shown classroom management and presentation techniques. In addition, students will be introduced to the principles of learning and instruction. Student will learn to formulate questions and employ good questioning technique. Each student will be given opportunities to prepare and present short lessons. Each student will be required to prepare and present at least two fiveminutes lessons based on computer science related topics. Student lessons will be evaluated by the student, class members and the instructor. 1 Credit

CP9102 Doctoral Seminar
The purpose of the Doctoral Seminar is to provide students exposure to the latest research, issues and findings related to the discipline of Computer Science. The seminar will consist of invited guests and talks by experts from industry, academia and graduate students themselves. Students will have an opportunity to improve their writing and critical thinking skills through assigned work associated with the seminar topics. All students are required to attend and actively participate in seminars every semester for a total of six semesters. A doctoral candidate must give two publicly announced research seminars on his/her thesis research. The student's supervisor(s) and at least one other member of the student's Dissertation Supervisory Committee must attend this seminar. The quality of the student's presentation will be graded on a Pass/Fail basis. Each student will be required to pass each research seminar presentation. Pass/Fail.