COURSE CALENDAR DESCRIPTION

Review of fundamental data structures. Analysis of algorithms: time and space complexity. Algorithm design paradigms: divide-and-conquer, exploring graphs, greedy methods, local search, dynamic programming, probabilistic algorithms, computational geometry. NP-complete problems. Prerequisites: cumulative GPA of 4.50 or better over all major EECS courses (without second digit "5"); LE/EECS 2030 3.00 or LE/EECS 1030 3.00; LE/EECS 2011 3.00; SC/MATH 1090 3.00; SC/MATH 1310 3.00. Previously offered as: LE/CSE 3101 3.00. PRIOR TO SUMMER 2013: course credit exclusion: SC/CSE 3101 3.00.

INSTRUCTOR(S)

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<th>Name</th>
<th>Section / Format / Term</th>
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<td>Edmonds, Jeffrey A</td>
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ADDITIONAL INFORMATION

CSE 3101 3.0 Design and Analysis of Algorithms This course is intended to teach students the fundamental techniques in the design of algorithms and the analysis of their computational complexity. Each of these techniques is applied to a number of widely used and practical problems. At the end of this course, a student will be able to: choose algorithms appropriate for many common computational problems; to exploit constraints and structure to design efficient algorithms; and to select appropriate tradeoffs for speed and space.

Topics covered may include the following:
• Review: fundamental data structures, asymptotic notation, solving recurrences, Sorting and order statistics: heapsort and priority queues, randomised quicksort and its average case analysis, decision tree lower bounds, linear-time selection
• Divide-and-conquer: binary search, quicksort, mergesort, polynomial multiplication, arithmetic with large numbers
• Dynamic Programming: matrix chain product, scheduling, knapsack problems, longest common subsequence, some graph algorithms
• Greedy methods: activity selection, some graph algorithms
• Amortisation: the accounting method, e.g., in Graham's Scan convex hull algorithm
• Graph algorithms: depth-first search, breadth-first search, biconnectivity and strong connectivity, topological sort, minimum spanning trees, shortest paths
• Theory of NP-completeness

Suggested reading:
• Jeff Edmonds. notes: "How to Think about Algorithms"

ACADEMIC INTEGRITY LINKS
• Senate Policy on Academic Honesty - http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/
• Academic Integrity - http://lassonde.yorku.ca/academic-integrity

STUDENT LINKS
• Student Rights and Responsibilities - http://oscr.students.uit.yorku.ca/student-conduct
• Religious Observance - https://w2prod.sis.yorku.ca/Apps/WebObjects/cdm.woa/wa/regobs
• Academic Accommodation for Students with Disabilities - http://secretariat-policies.info.yorku.ca/policies/academic-accommodation-for-students-with-disabilities-policy/
• Counselling and Disability Services - http://cds.info.yorku.ca/
• York University’s Policies on Sexual Violence - http://secretariat-policies.info.yorku.ca/policies/sexual-violence-policy-on/
• York University’s Policies on Gender/LGBTQ*/Positive Space - http://rights.info.yorku.ca/lgbtq/

LAND ACKNOWLEDGEMENT
• We acknowledge our presence on the traditional territory of many Indigenous Nations. The area known as Tkaronto has been care taken by the Anishinabek Nation, the Haudenosaunee Confederacy, the Huron-Wendat, and the Métis. It is now home to many Indigenous Peoples. We acknowledge the current treaty holders, the Mississaugas of the New Credit First Nation. This territory is subject of the Dish With One Spoon Wampum Belt Covenant, an agreement to peaceably share and care for the Great Lakes region.
• The Indigenous Framework for York University: A Guide to Action can be found here: http://indigenous.info.yorku.ca/
• Meaning of a land acknowledgement: http://healthydebate.ca/opinions/indigenous-land-acknowledgements

Many courses utilize Moodle, York University’s course website system. If your course is using Moodle, click here to access it.
Moodle @ York University