EXPANDED COURSE DESCRIPTION
ELECTRICAL ENGINEERING AND COMPUTER SCIENCE
Lassonde School of Engineering
Electrical Engineering Computer Science
LE / EECS 3101 3.0 SECTION M
DESIGN AND ANALYSIS OF ALGORITHMS
FALL 2019 / WINTER 2020

Last Modified Date: 08/02/2019

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 2011 3.00; SC/MATH 1090 3.00; SC/MATH 1310 3.00. Course credit exclusion: LE/SC CSE 3101 3.00.

INSTRUCTOR(S)

<table>
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<tr>
<th>Name</th>
<th>Section / Format / Term</th>
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<td>Edmonds, Jeffrey A</td>
<td>Sec. M / LECT / W</td>
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ADDITIONAL INFORMATION

TOPICS & CONCEPTS

Unit 1: Loop Invariants for Iterative Algorithms (6 hours)
Unit 2: Recursive Algorithms
Unit 3: Graph Search Algorithms and Network Flow
Unit 4: Greedy Algorithms Methods
Unit 5: Dynamic Programming
Unit 6: Reductions and NP-Completeness

COURSE LEARNING OUTCOMES

• Choose an appropriate algorithm to solve a given computational problem, and justify that choice
• Design new algorithms using a variety of techniques (recursion, greedy algorithm, dynamic programming, backtracking)
• Prove correctness of an algorithm using pre- and post-conditions and loop invariants
• Prove bounds on the running time of an algorithm
• Apply standard graph algorithms to a variety of problems

GRADING SCHEMES

Unit Tests (Ti): Worth between 5%*4=20% and 14%*4=56%
Class Participation (P): Worth between 2% and 10%
Exam: Worth between 34% and 78%

SUGGESTED OR REQUIRED TEXTBOOKS

Optional: How to Think about Algorithms: Cambridge House Press

COURSE LEARNING OUTCOMES

• CLO 1 Choose an appropriate algorithm to solve a given computational problem, and justify that choice
• CLO 2 Design new algorithms using a variety of techniques (recursion, greedy algorithm, dynamic programming, backtracking)
• CLO 3 Prove correctness of an algorithm using pre- and post-conditions and loop invariants
• CLO 4 Prove bounds on the running time of an algorithm
• CLO 5 Apply standard graph algorithms to a variety of problems

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/
• Student Accessibility Services (SAS) - https://accessibility.students.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