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CMPT 2225: Data Structures and Programming

EFFECTIVE DATE

May 2020

DEPARTMENT

UT Computing Science&Software

DESCRIPTION

This course introduces students to data structures and algorithms, including their design, analysis, and implementation. Topics include object-oriented design and object-oriented programming with a study of inheritance, encapsulation and polymorphism, techniques for searching and sorting, time and space efficiency of algorithms, and practical data structures, including arrays, linked lists, stacks, queues, trees, heaps, priority queues, hash tables, and graphs. Programs are written in C++.

CREDITS

3.0

YEAR OF STUDY

2nd Year Post-secondary

PREREQUISITES

CMPT 1020 with a C and MATH 1120 with a C

COREQUISITES

N/A

COURSE LEARNING OUTCOMES

Upon successful completion of this course, students will be able to:

- Apply object-oriented design principles with focus on data abstraction and information hiding
- Identify fundamental data structures and algorithms
- Analyze time and memory efficiency of algorithms
- Choose appropriate data structures and algorithms for specified applications
- Write programs for different types of searching and sorting algorithms
- Implement stacks, queues, and priority queues in C++
- Write programs using Standard Template Library (STL)
- Apply STL containers, iterators, and algorithms in C++ programs

- Develop programs using data structures such as trees, heaps, hash tables, and graphs

PRIOR LEARNING ASSESSMENT & RECOGNITION (PLAR)

None

HOURS

Lecture: 45

Lab: 15

INSTRUCTIONAL STRATEGIES

Lectures and computer labs (and assignments)

GRADING SYSTEM

Letter Grade (A-F)

PASSING GRADE

C-

EVALUATION PLAN

Type	Percentage	Assessment activity
Assignments	25	In class assignments and take home assignments
Midterm Exam	20	Midterm #1
Midterm Exam	20	Midterm #2
Final Exam	35	Final Exam

COURSE TOPICS

- Object-oriented design principles (polymorphism, encapsulation, and inheritance)
 - Recursion
 - Sorting algorithms
 - Searching algorithms
 - Algorithm efficiency
 - Linked lists, stacks, and queues
 - Standard Template Library (STL)

Maps
Sets
Trees
Binary search trees
Priority queues and heaps
Hash tables
Graphs

LEARNING RESOURCES

None

Notes:

- Course contents and descriptions, offerings and schedules are subject to change without notice.
- Students are required to follow all College policies including ones that govern their educational experience at VCC. Policies are available on the VCC website at:
<https://www.vcc.ca/about/governance--policies/policies/>.
- To find out how this course transfers, visit the BC Transfer Guide at <https://www.bctransferguide.ca>.

Broadway campus

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Downtown campus

250 West Pender Street
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