CompST 701: Mathematical and Computing Fundamentals for IT Professionals

Fall 2018 (online)

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Office Hours: 12.30-2.30 pm on Sept. 10, Sept. 24, Oct. 8, Oct. 22, Nov. 5, Nov. 26, Dec. 3, and Dec. 10 (these are Mondays). You are welcome to e-mail questions at any time or set up a time to meet.

Introduction

CompSt 701 covers important discrete mathematics topics and their applications. The material serves as a foundation to many courses in the computing field. There is no required or recommended textbook. Modules, homeworks, and midterm examination will be available in D2L (d2l.uwm.edu). Homeworks and midterm examination will be made available as Microsoft Word files with questions and blank spaces for answers and students are expected to use these spaces for answers and upload the modified files in D2L for grading. The dropbox in D2L is an individual submission folder which means that a student can see the work only he/she submitted. If there are problems in uploading your work in D2L by the deadline, e-mail it to mali@uwm.edu by the deadline and upload the exactly same version in D2L later.

The class has four major themes:

1. Mathematical Reasoning. You will learn logic and reasoning techniques that will enable you to show that a mathematical statement is true or an algorithm is correct.

2. Discrete Structures. You will learn important mathematical structures that are used to represent objects and their relationships. These discrete structures include sets, functions, graphs, etc.

3. Counting and Probability. Yes, you will learn how to count! Once you know how, you will be able to compute the probabilities of many events. Both skills are important for designing good algorithms.
4. Basic Algorithm Design and Analysis. You will learn the basics of designing and analyzing efficient algorithms.

**Topics**
1. Logic, Propositional equivalences
2. Rules of Inference, Applications of logic to knowledge bases, puzzles and satisfiability problems
3. Sets and Set Operations
4. Functions
5. Mathematical Induction
6. Basics of counting
7. Counting: Permutations and Combinations without repetition
8. Counting: Permutations and combinations with repetition
9. Basics of Probability
10. Graphs and Graph Models, Trees
11. Graph Connectivity and Basic Graph Traversals
12. Review of logarithms, exponentials, and summations, Growth of functions, Complexity of Algorithms
13. Recursive Algorithms
14. Shortest Path Algorithms

**Grading**
Homeworks: 60%
Exams (midterm and final): 20% each
(The midterm will be based on the first seven topics. The final examination will be based on topics 8-14.)
Midterm: Oct. 26 (Friday), 3-5 pm (online)
Final exam: Dec. 19 (Wednesday), 3-5 pm (on UWM campus)
Both exams are open-book and open-notes, but the final exam is to be solved on paper. Use of electronic devices during final exam is prohibited.
In case of an emergency, contact the instructor at the earliest possible opportunity via e-mail. No arrangements will be made for missed exams or
homeworks unless this rule is followed, and an acceptable evidence of legitimate emergency is submitted. Please also be aware of the standard University policies: www4.uwm.edu/secu/news events/upload/Syllabus-Links.pdf

**Participation by Students with Disabilities** If you need special accommodation in order to meet any of the requirements of this course, please contact me as soon as possible unless you have asked ARC (Accessibility Resource Center) to send your needs to me.

**Accommodation for Religious Observances:** Students will be allowed to complete examinations or other requirements that are missed because of a religious observance. See [https://www4.uwm.edu/secu/docs/other/S1.5.htm](https://www4.uwm.edu/secu/docs/other/S1.5.htm).

**Students called to military service:** Detailed information is available at [http://www4.uwm.edu/academics/military.cfm](http://www4.uwm.edu/academics/military.cfm)

**Academic Misconduct**

Students are responsible for the honest completion and representation of their work, for the appropriate citation of sources and for respect of others’ academic endeavors. The solutions you submit must be your own. See [http://www4.uwm.edu/acad aff/policy](http://www4.uwm.edu/acad aff/policy) for various UWM policies about academic affairs. Similarity between solutions will be checked to detect academic misconduct. More academic-misconduct information is provided next.

UWM expects each student to be honest in academic performance. Failure to do so may result in discipline under rules published by the Board of Regents (UWS 14) and the UWM implementation provisions (Faculty Document 1686). Academic misconduct is an act in which a student seeks to claim credit for the work or efforts of another without authorization or citation, uses unauthorized materials or fabricated data in any academic exercise, forges or falsifies academic documents or records, intentionally impedes or damages the academic work of others, engages in conduct aimed at making false representation of a student’s academic performance, or assists other students in any of these acts. The most common forms of academic dishonesty are cheating and plagiarism.
Cheating includes:

- Obtaining and using unauthorized material, such as a copy of an examination before it is given
- Submitting material that is not yours as part of your course performance, such as copying from another student’s exam, or allowing a student to copy from your exam
- Using information or devices not allowed by the faculty; such as using formulas or data from a computer program, or using unauthorized materials for a take-home exam
- Fabricating information, such as data for a lab report
- Violating procedures prescribed to protect the integrity of an assignment, test, or other evaluation
- Collaborating with others on assignments without the faculty’s consent
- Cooperating with or helping another student to cheat
- Other forms of dishonest behavior, such as having another person take an examination in your place; or, altering exam answers and requesting the exam be re-graded; or, communicating with any person during an exam, other than the exam proctor or faculty

Plagiarism includes:

- Directly quoting the words of others without using quotation marks or indented format to identify them
- Using sources of information (published or unpublished) without identifying them
- Paraphrasing materials or ideas of others without identifying the sources
- Internet Plagiarism

For more information, go to: http://www4.uwm.edu/acad_aff/policy/academicmisconduct.cfm