CMPSCI 145
Spring 2018
Representing, Storing, and Retrieving Information

Professor William T. Verts

Class:

Lectures: Monday, Wednesday, Friday 11:15AM–12:05PM, ILC N101.

Office Hours and Email:

LGRC A357, Office hours M/W/F 2:45-3:45, and appointments at our mutual convenience. On Mondays I must leave directly after class, as I will be attending noon-time CMPSCI faculty meetings.

verts@cs.umass.edu Personal, for asking questions. Put CMPSCI 145 in the subject line.
literacy@cs.umass.edu For submitting on-line materials. Put CMPSCI 145 in the subject line.

I read all email daily, but do not expect a speedy reply. I might not reply at all if the question is something I can address in class. Do NOT email attachments to me; they will be deleted. Do not call me at home.

TA: The TA(s) will hold office hours in LGRT 222, perform the grading, and be available to assist in all aspects of this course. Hours to be arranged. TA office is shared by all TAs and graders for all my courses.

Books: **REQUIRED:** *Representing, Storing, and Retrieving Information*, 4TH Edition, ©2009, William T. Verts.

REQUIRED: *Computer Science Companion*, REVISED 3RD Edition, 2017 Printing, ISBN 9781524943998, ~$28, by me. (It is OK if you have the unrevised 3RD edition from last year, but the revised version has new information, errors have been corrected, and it is now in color.) The *Computer Science Companion* is a required text for COMPSCI 105, 119, 120, and 145.

Web: http://www.cs.umass.edu/~verts (then follow the link to the 145 page), or:
http://www.cs.umass.edu/~verts/cmpsci145/cmpsci145.html
http://www.cs.umass.edu/~verts/cmpsci145/quizzes/quizzes.html

Social Media:

Please do not "friend" me on Facebook, Linked-In, or other social networks. I reserve Facebook for relatives, hiking buddies, and friends from high-school. I do not often post messages on Twitter.

Course Scoring (percentages may change according to number and type of assignment):

Midterm 1	15% (open book, March 2, in-class)
Midterm 2	15% (open book, April 6, in-class)
Final Exam	25% (open book, Thursday, May 3, 10:30am, in Hasbrouck 134, with a take-home portion)
Homework	15% (formally assigned homework, in-class exercises, in-class quizzes, etc.)
Projects:	30% (singly, but there may be small group projects)

Letter grades will be assigned according to final computed course score:

A ≥ 90%, A- ≥ 88%, B+ ≥ 86%, B ≥ 80%, B- ≥ 78%, C+ ≥ 76%, C ≥ 64%, C- ≥ 62%, D+ ≥ 60%, D ≥ 50%, F < 50%. Missing either of the midterms, or the final exam, incurs an automatic F for the course. Fractional final course scores are rounded to the nearest integer. For example, 87.49999 rounds down to 87 (B+), while 87.50000 rounds up to 88 (A-).

Computer: It is expected that you either have your own computer running a later version of Mac OS-X or Windows (typically Windows 7, 8, or 10). Assignments may be completed on OIT equipment in UMass campus labs, but you *might* have some difficulties in using class-provided software there. Home computers should have a recent version of Microsoft Word and Excel installed. You must also have a working Internet connection and Web browser (Mozilla Firefox or Google Chrome recommended). Ability to read .PDF files and to pack and unpack .ZIP files is required. Get a USB flash drive (SanDisk recommended) for archiving your data files, and for bringing work in to me or the TA to examine. I may provide free software for you to use.

Final Notes:

1. **DO YOUR OWN WORK, INCLUDING HOMEWORK AND LAB WORK.** You may <u>discuss</u> homework and lab assignments with other students, but you <u>may not share files or disks</u>. Any essays or term papers must be your own work as well. Upon discovery of duplication, I will contact you for a conference, as required in the guidelines set out by the University of Massachusetts Academic Honesty Policy, and we will resolve the issue according to those guidelines. See the document at:

   http://www.umass.edu/dean_students/codeofconduct/acadhonesty/

2. **Do not** ask for extra work after the end of the semester to boost an undesirable grade. I never grant such requests.

3. Please contact me directly if you have any concerns about the running of the course, the TA, grading, etc.

		Monday	Wednesday	Friday
JANUARY	1	**January 22** – First Day. What's it all about? Why do we care?	**January 24** – Analog Devices that are Mechanical. Antikythera Machine.	**January 26** – More about Analog Mechanical Devices. Slide Rules.
	2	**January 29** – Digital Devices that are Mechanical. Punched Cards.	**January 31** – More about Digital Devices. Comptometer.	**February 2** – Basic Electricity: Ohm's Law and resistor networks.
FEBRUARY	3	**February 5** – Analog Functional Elements.	**February 7** – Digital Functional Elements (Gates).	**February 9** – Digital Devices, introduction to unsigned binary integers.
	4	**February 12** – Signed binary integers (Sign&Mag, 1's Comp, 2's Comp).	**February 14** – Continuation of Signed Integer representations.	**February 16** – Rational and Fixed-Point numbers. IEEE 754 Floating Point representations.
	5	**February 19 – Presidents Day HOLIDAY**	**February 21** – Continuation of Floating Point representations.	**February 23** – Round-Off Errors. Interval Arithmetic and UNUMs
	6	**February 26** – Symbolic representations. Machine Language and Compilers.	**February 28** – Review for midterm.	**March 2 – MIDTERM #1**
MARCH	7	**March 5** – Parametric Lines and Curves.	**March 7** – Quadratic Splines, Bézier Curves, Lagrange Interpolation.	**March 9** – Computational Geometry and Graphics Issues.
	8	**March 12 – SPRING BREAK**	**March 14 – SPRING BREAK**	**March 16 – SPRING BREAK**
	9	**March 19** – More on Graphics and Geometry. Ray-Tracing.	**March 21** – Frequency Analysis, Audio representations.	**March 23** – Representations of Video.
	10	**March 26** – Basic Searching, Big-O Notation, Self-Organizing Lists, Trees	**March 28** – Hashing, the Soundex algorithm.	**March 30** – Sorting. Intro to simple Database Queries.
APRIL	11	**April 2** – Queries (Linear, Random-Access, Hierarchical). Pyramids.	**April 4** – Review for midterm.	**April 6 – MIDTERM #2**
	12	**April 9** – Intro: Information Theory, Serial vs. Parallel, UARTs.	**April 11** – Parity and Cyclic Redundancy Checks, Hamming distance.	**April 13** – Error Detection and Correction.
	13	**April 17 (TUESDAY)** – Compression: Run-Length Encoding, Huffman Coding.	**April 18** – Delta Modulation, LZW compression.	**April 19** – Coding: Morse, Nerds in the Woods, QR, Data Matrix, etc.
	14	**April 23** – More on Coding, what is encryption?	**April 25** – Cryptography: single key vs. public key.	**April 27** – More on public key encryption. Steganography.
	15	**April 30** – Last Day of Class. Review of Course. Review for Final Exam.	**FINAL EXAM:** THURSDAY MAY 3 10:30AM HASBROUCK 134	