

CMPSCI 145 Syllabus

Representing, Storing, and Retrieving Information

Spring 2015

Professor William T. Verts

Office and Email:

LGRC A356 / LGRC A357

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Personal, for asking questions.

Put CMPSCI 145 in the subject line.

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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.

Hours: Tuesday & Thursday 2:00-3:30, immediately after class, and by appointment at our mutual convenience. On most Fridays and on one Monday per month I must leave directly after class and cannot stay to talk, as I will be attending noon-time CMPSCI faculty meetings.

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>

TA: Hannah Blau, blau@cs.umass.edu. The TA will hold office hours in LGRC A304.5, perform the grading, and be available to assist in all aspects of this course. Hours TBA.

Class: Hasbrouck 134, Monday, Wednesday, Friday 11:15AM–12:05PM.

Books: *Representing, Storing, and Retrieving Information*, 4TH Edition, ©2009, William T. Verts.
Computer Science Companion, 1ST Edition, ©2014, William T. Verts

Scoring:

Midterm 1	15% (open book, February 27, in-class)
Midterm 2	15% (open book, April 1, in-class)
Final Exam	25% (open book, Friday, May 1, 10:30am, 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 \geq 90%, A- \geq 88%, B+ \geq 86%, B \geq 80%, B- \geq 78%, C+ \geq 76%, C \geq 64%, C- \geq 62%, D+ \geq 60%, D \geq 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 (87.49999 rounds down to 87 for a B+, while 87.50000 rounds up to 88 for an A-).

Computer: It is expected that you either have your own PC running a later version of Windows (typically Windows 7 or 8), or have access to a PC where you can install Windows software from the class. Mac users may wish to consider installing software to allow them to run Windows programs. 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 Microsoft Word and Excel installed (Office 2010 recommended for the PC, or Office 2011 for the Mac). 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.

Final Notes:

1. **DO YOUR OWN WORK, INCLUDING HOMEWORK AND LAB WORK.** You may discuss homework and lab assignments with other students, but you may not share files or disks. 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: 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		
1	January	19 – Holiday – MLK	21 – First Day. What’s it all about? Why do we care?	23 – Analog Devices that are Mechanical. Antikythera Machine.	January	
2		26 – More about Analog Mechanical Devices. Slide Rules.	28 – Digital Devices that are Mechanical. Punched Cards.	30 – More about Digital Devices. Comptometer.		
3	February	2 – Basic Electricity: Ohm’s Law and resistor networks.	4 – Analog Functional Elements.	6 – Digital Functional Elements (Gates).	February	
4		9 – Digital Devices, introduction to unsigned binary integers.	11 – Signed binary integers (Sign&Mag, 1’s Comp, 2’s Comp).	13 – Continuation of Signed Integer representations.		
5		16 – Holiday – President’s Day	18 – Rational and Fixed-Point numerical representations.	20 – IEEE Floating Point representations.		
6		23 – Continuation of Floating Point issues. Round-Off Errors.	25 – Symbolic representations.	27 – MIDTERM #1		
7	March	2 – Parametric Lines and Curves.	4 – Quadratic Splines, Bézier Curves, Lagrange Interpolation.	6 – Computational Geometry and Graphics Issues.	March	
8		9 – More on Graphics and Geometry. Ray-Tracing.	11 – Frequency Analysis, Audio representations.	13 – Representations of Video.		
9		16 – Holiday – Spring Break	18 – Holiday – Spring Break	20 – Holiday – Spring Break		
10		23 – Basic Searching, Big-O Notation, Self-Organizing Lists, Trees	25 – Hashing, the Soundex algorithm.	27 – Sorting. Intro to simple Database Queries.		
11	April	30 – Queries (Linear, Random-Access, Hierarchical). Pyramids.	1 – MIDTERM #2	3 – Intro: Information Theory, Serial vs. Parallel, UARTs.	April	
12		6 – Parity and Cyclic Redundancy Checks, Hamming distance.	8 – Error Detection and Correction.	10 – Compression: Run-Length Encoding, Huffman Coding.		
13		13 – Delta Modulation, LZW compression.	15 – Coding: Morse, Nerds in the Woods, QR, Data Matrix, etc.	17 – More on Coding, what is encryption?		
14		20 – Holiday – Patriot’s Day	22 – Cryptography: single key vs. public key.	24 – More on public key encryption. Steganography.		
15		27 – Special Topics, or overflow day in case other topics run long.	29 – Last Day of Class. Review of Course.	1 – Final Exam, 10:30am		May