CS-350: Computer Organization, Spring 2008 Semester
Course Syllabus

© 2008 Charles Abzug

Summary Course Description:

This course provides a solid theoretical foundation that furnishes the student with insight into the innermost workings of the modern digital computer, together with a thorough understanding of the organization and architecture of real computers. Students learn how a digital computer works through thorough study of the principles of operation of logic circuits of progressively increasing complexity. Number systems are reviewed, and various schemes for the digital representation of numbers are also discussed, as well as the principles of digital integer arithmetic, to provide insight into several different ways that arithmetic calculations can be made in digital computers.

The principal subsystems of a modern digital computer are surveyed, including the Central Processing Unit (CPU), system bus and subsidiary buses, primary storage (RAM and ROM), including both main memory and cache memory, secondary storage (Hard Disk Drive (HDD) and floppy drives, CD-ROM and DVD-ROM drives), input/output ports, and several types of input/output devices.

Basic electronics is reviewed, in order to convey an understanding of the operation of the fundamental logic circuits (AND gates, OR gates, NOT gates, buffer gates, XOR gates and XNOR gates) that constitute the building blocks for higher-level logic, and some more complex digital integrated circuits. The types of integrated circuits that are studied include simple combinational logic, such as latches, flip-flops, and registers, combinational logic of intermediate complexity, including multiplexors, demultiplexors, encoders and decoders, and several examples of more highly complex integrated circuits, such as an Arithmetic Logic Unit (ALU), a simple bus, "Random Access Memory" (RAM) and "Read-Only Memory" (ROM) modules.

Computer operations are introduced, along with the representation of computer operations in an Assembly Language. Implementation of program statements in a Higher Level Language, such as C or C++, is studied through the decomposition of each higher-level language statement into a sequence of machine or Assembly-Language instructions, and some of these are further decomposed into sequences of micro-operations. The operation of major subsystems of the computer is examined through decomposition of a subsystem into an organized set of simpler circuit elements.

Additional critical subjects covered include the principles of hierarchical computer organization, machine instruction sets, addressing modes, CISC vs. RISC, input/output processing, and interrupt handling, as well as the application of many of these concepts to modern personal computers, and the boot process.

Main Course Textbooks (REQUIRED):

NOTE: Items (1a) and (1b) are available as a bundled unit at no additional cost over that of item (1a) alone. The bundled unit bears the ISBN of **0-7637-4645-2.**

(1a)   NULL, LINDA; & LOBUR, JULIA (2006). *The Essentials of Computer Organization and Architecture. Second Edition.* Sudbury, MA: Jones & Bartlett Publishers, Inc. QA76.9.C643 N85 2006; 004.2'2—dc22; 2005032106; ISBN 0-7637-3769-0.

(1b)   Null, Linda (2006). *An Introduction to Intel Assembly Language.* Sudbury, MA: Jones & Bartlett
          Publishers, Inc. ISBN 0-7637-3585-X.

(2)   MAXFIELD, CLIVE RICHARD (2002). *Bebop to the Boolean Boogie. An Unconventional Guide to Electronics
        Fundamentals, Second Edition.* Boston, MA: Newnes (Elsevier). TK7868.D5 M323 2003; 821.39'5—
        dc20; 2002038930; ISBN 0750675438.

Supplementary Materials (Recommended but NOT required):

Grammar and Writing:

        NOTE that a significant portion of this course will consist of a term paper. The following
        materials are recommended to assist and guide you in improving your writing skills:

(3)   BRIANS, PAUL (2003). *Common Errors in English Usage.* Wilsonville, OR: William, James & Co.
        PE1464 .B75 2003; 421/.1 21; 2003044605; ISBN 1887902899. [Provides a list of common errors
        along with an explanation of each.]

(4)   GORDON, KAREN ELIZABETH (1993a). *The Deluxe Transitive Vampire: The Ultimate Handbook of
        Grammar for the Innocent, the Eager, and the Doomed.* New York, NY: Pantheon Books. ISBN:
        0679418601. [This book is a concise, wittily written tutorial on the fine points of grammar.]

(5)   GORDON, KAREN ELIZABETH (1993b). *The New Well-Tempered Sentence: A Punctuation Handbook for
        the Innocent, the Eager, and the Doomed.* New York, NY: Pantheon Books. PE1450.G65 1993;
        428.2—dc20; 93-18454; ISBN 0-395-62883-0. [This book is a concise, wittily written tutorial on the
        fine points of punctuation.]

(6)   DUPRE, LYN (1998). *Bugs in Writing Revised. A Guide to Debugging Your Prose.* Reading, MA:
        Addison-Wesley. ISBN: 0-201 37921-X. [The author specifically addresses the needs of computer
        professionals and other technical people to write clearly.]

(7)   STRUNK, WILLIAM, JR.; & White, E.B. (2000). *The Elements of Style. With Revisions, an Introduction, and
        a Chapter on Writing. Fourth Edition.* New York, NY: Longman. PE1408.S772 1999; 808'.042—
        dc21; 99-16419; ISBN 0-205-30902-X (paperback) or 0-205-31342-6 (casebound). [A classic on
        clarity in writing.]

Learning Objectives:

By the end of this course, the student should:

(1)   understand the operational characteristics of computer hardware, including basic machine subsystems and their principal components;

(2)   understand the principles of positional number representation, and be able to convert a number represented in any possible radix to the equivalent number represented in any other radix;

(3)   understand the difference between information and its representation on a machine, and be able to interpret a sequence of bits differently according to whether it represents an integer in any of several different representational schemes, a floating-point number in any of several possible formats, a text character, a machine instruction, a memory address, etc.;

(4)   understand how data are moved around and manipulated inside a computer, and also inside representative major subsystems, and be able to describe the operation of the machine in terms of both machine language instructions and micro-operations;

(5)   understand the operation both of floppy disk drives and of hard drives;

(6)   explain how a disk is organized to hold data;

(7)   understand how memory is organized in a modern digital computer, explain the memory map of a PC, and ascertain the memory configuration of a PC;

(8)   understand the principles of integer computer arithmetic, and be able to specify what would be the register contents and status flag conditions resulting from addition or subtraction of two numbers using the rules of unsigned numbers, signed-magnitude numbers, ones' complement and two's complement numbers, and saturation arithmetic;

(9)   understand the basic principles of machine operations, addressing modes, and assembly language, and be able to write a simple assembly language program that could be used to implement a single instruction in a higher-level-language program, making use of one or more of the addressing modes of the assembler;

(10)   understand the sequence of steps that takes place when a computer is booted up, and be able to partition a hard disk drive and install an alternative operating system, so that at boot-up time one of the operating systems installed on the machine can be selected to run.

Course Coverage:

1.   Integer numbers and their representation (positional number systems)
     a.   Decimal Numbers
     b.   General Number Representation: the Radix
     c.   Binary Numbers
     d.   Octal Numbers
     e.   Hexadecimal Numbers
     f.   Interconversion among Number Representations
               i.   Other radices to decimal
               ii.   Decimal to other radices
               iii.   Binary to Octal and Octal to Binary
               iv.   Binary to Hexadecimal and Hexadecimal to Binary

2.   Logic Circuits
    (a)   Individual Logic Gates:
        (i)   NOT
        (ii)   Buffer
        (iii)   AND and NAND
        (iv)   OR and NOR
        (v)   XOR (odd function)
        (vi)   XNOR (even function)
    (a)   Simple Logic Circuits: Small-Scale Integration (SSI)
    (b)   Complex Logic Circuits: Medium-Scale Integration (MSI)

3.   Basic Electronics

4.   Principal Elements of a Computer
    a.   Central Processing Unit (CPU) or Microprocessor
    b.   Bus
        i.   Power Bus
        ii.   Data Bus
        iii.   Address Bus
        iv.   Control Bus
    c.   Memory
        i.   Rewritable Memory ("Random Access Memory", or RAM)
        ii.   Not-Readily-Rewritable Memory ("Read-Only Memory", or ROM)
                (1) simple ROM
                (2) Programmable "Read-Only Memory" (PROM)
                (3) Erasable Programmable "Read-Only Memory" (EPROM)
                (4) Electrically Erasable Programmable "Read-Only Memory" (EEPROM),
                      also known as "flash memory"
        iii.   Memory Size
        iv.   Memory Addressing
        v.   The Memory Map
        vi.   Direct Memory Access (DMA)
    d.   Input and Output, and Data Storage:
    i.   HDD (Hard Disk Drive)
    ii.   Floppy Disk
    iii.   "ZIP", "JAZ", etc.
    iv.   CD-ROM

5.   Computer Operations
    a.   What does a bit sequence represent?
        i.   Instruction
        ii.   Address in memory or elsewhere
        iii.   Data
                (a)   Number: Multiple schemes for representing binary numbers
                      (1)   Unsigned Integer
                      (2)   Signed-Magnitude
                      (3)   Ones' Complement
                      (4)   Two's Complement
                (b)   Text
                (c)   Other forms of data
    b.   Controlling the computer

6. Integer Arithmetic
    a. Understanding Decimal Addition and Subtraction
    b. Addition and Subtraction in Binary
    c. Integer Arithmetic in Digital Computers
        (i)   Limitation in the Number of Bits Represented
        (ii)   Addition and Subtraction using each representation
               (5) Unsigned Integer Arithmetic
               (6) Signed-Magnitude Arithmetic
               (7) Ones' Complement Arithmetic
               (8) Two's Complement Arithmetic
               (9) Saturation Arithmetic

7. Writing and storing programs, retrieving programs from storage, and running programs
    a. Source Code
    b. Object Code

8. Understanding the CPU
    a. Accumulator
    b. Basic Addressing Modes: Implied, Immediate, and Indirect
    c. Status Flags
    d. Basic Arithmetic-Logic Unit (ALU)
    e. Arithmetic Instructions
    f. Shifter/Rotator
    g. Internal Communications Paths
    h. Instruction Register
    i. Control Logic
    j. Program Counter and Auxiliary Program Counters
    k. Simple Control Instructions:
        i.   Unconditional Jump
        ii.   Conditional Jumps
    l. Intermediate Addressing Modes:
        i.   Indirect
        ii.   Indexed
        iii. Autoincrement and Autodecrement Indexed Addressing
              (1) Pre-indexed
              (2) Post-indexed
    m. Stack and Stack Pointer
    n. Intermediate Control Instructions
        a.   Jump to Subroutine
        b.   Return from Subroutine
    o. Interrupt Vector

9. Input and Output

    a. Numeric Keypad and Display
    b. Keyboard

10. Basics of Assembly Language

Course Practices:

Attendance Policy, and Relationship of Course Sessions to Readings: In class, announcements are sometimes made of new or changed course policies, requirements, modifications to assignments, etc. Information provided in such announcements might not appear anywhere in the course documentation. Furthermore, course sessions will cover *some* of the material in the readings, but will *also* include some material *not* covered by the readings. Therefore, students **must** not only do all of the readings, but must **also** attend **all** classes.

Normally, there are only three acceptable grounds for a student's missing a class: (1) grave medical or (2) serious personal problems affecting the student him/herself, or in some cases affecting a member of the student's immediate family[1]. The other acceptable excuse for a student's missing a class is (3) *force majeur* (overpowering force due to an unexpected and uncontrollable event). An example of *force majeur* is the occurrence of a flat tire or of a motor vehicle accident involving your vehicle while you are traveling to class. If you want to claim exemption on one of these three grounds, be prepared to submit evidence (*e.g.,* a note from a licensed physician on the physician's stationery, or a copy of an official police accident report).

Attendance is normally taken at every class. Your presence in class does **not** get factored **directly** into the grading process. Why, then, is attendance taken? The purpose is three-fold: (i) attendance data sometimes provide me with advance information that a student may be experiencing academic difficulty because of medical or personal problems, or for some other reason. In addition, (ii) I may also consult attendance records in deciding how much I am willing to extend myself in providing help should you get into academic difficulty during the semester. You are in a much better position to get a "break" if you have been conscientiously attending class. Note, however, that **I do reserve the right to reduce a student's grade if he/she either has an excessive total number of unexcused absences (four or more), or is absent on the class day immediately before or immediately after an official university holiday, or whose classroom behavior is disruptive.**

Note that if you do miss out on a class, it is **your** responsibility to find out what we covered in class, as well as what announcements might have been made. It is also your responsibility to obtain the missed material. "I wasn't in class when you made that announcement" is **not** an acceptable excuse for your failure to comply with any directives issued in class. Please see the companion to this section entitled, "Policy Regarding Classes Missed by Students".

E-mail on Course-Related Matters: All E-mail messages related to the course must be identified by a Subject header that begins by identifying the course and section about which the body of the message is concerned. The complete Subject header must be of the form: *CS-350 {additional subject description},* and additional subject identification is appended following the course number.

Format for Submitted Homeworks: Submitted homeworks are *required* to be of the following form in order for you to receive credit:
.

    (1) Your name must appear **legibly** in the top left corner of the first page and of all odd-numbered pages.

    (2) On the first page *only*, following your name, you must write the course number: *CS-350***.**

    (3) Next, there must be a declaration of compliance with the JMU Honor Code, **including your signature.**

---

[1] Immediate family, as defined for the purpose of this policy, consists of your father/grandfather, mother/grandmother, sister, brother, spouse, or fiancé to whom you are formally engaged. Please NOTE that as far as *I* am concerned, your girlfriend/boyfriend is not a member of your immediate family.

(4) On the first page *only*, in the center of the page near the top, you must prominently write: *Assignment #* _____ (fill in the assignment number)**;** *Chapter #* _____ (fill in the chapter number).

(5) Each numbered problem must start on a new line, with the number of the problem clearly identified at the beginning of the line.

(6) Skip two lines or more after each problem.

(7) Write your solutions **_legibly._**

(8) Fasten the pages together by stapling them in the upper left-hand corner. Paper clips or dog-earing of the pages is **NOT** acceptable *in lieu of* a staple. Please note that if you cannot afford to buy a stapler, or if you forget to bring it with you, there are several staplers available for student use in the CISAT Copy Center in Room 1002. There is no charge for use of the Copy Center's staplers.

(9) Bring the completed assignment in to class **on the date that it is due,** and be prepared to submit it at the beginning of class.

Grading of Tests and Assignments, and the JMU Honor Code: You will eventually be assigned an overall course grade. The course grade will be based principally upon your performance on quizzes, exams, homework assignments, projects, etc. Integrity of the grading process requires that you be graded on the basis of **your own work,** and not on someone else's. Yet, sometimes you may get stymied and not be able to complete an assignment on your own. *If you find it necessary to obtain help from someone else in completing your assignment, you are __required__ to indicate that by clearly marking it on your assignment.* Thus, if one of your colleagues contributes a line of code to your computer program, you should plainly mark that via a comment inserted into the text of the program, as in the following example:

```
//Hieronymous Johnson kindly contributed the following line of code to my program:
for (int i=0, k=4-I; i<10; k=Math.abs(4-++I+(i>4?1:0)));          2
```

Similarly, non-programming assignments should be clearly footnoted or annotated to indicate where someone else's help contributed to the product. In the absence of a clear annotation in your submitted assignment, you will be assumed to be the sole author of all work that you submit. Should that turn out not to be the case, it will be accounted as an honor code violation and will be dealt with severely. Details of the JMU Honor Code are to be found at: http://www.jmu.edu/honor/

Honor Code: The JMU Honor Code specifies that every assignment, whether written or electronically submitted by a student, is submitted pursuant to the Honor Code, and **must contain a declaration** stating that "This work complies with the JMU Honor Code.", together with your signature. For **this course,** it is required that you place this signed declaration **on the first page** of your assignment. If the Honor Code declaration is not included *at the time that the assignment was submitted*, your grade for that assignment will be a zero. It is **your** responsibility to see to it before submitting your work that your signed Honor Code declaration is easily found on the first page of your assignment. The faculty can **_not_** be bothered chasing after students to get them to add their Honor Code declaration afterwards.

Programming Projects and Major Assignments: Programming projects and major assignments, such as a term project or an essay ("paper") must be machine-generated (i.e., not hand-written), and must be submitted **both** in hard- **and** in soft-form.

---

[2] I am indebted to Prof. David Brunner for contributing the coding example shown above.

Format for Submission of Programming Projects and Major Assignments: Multiple pages of hard-copy <u>must</u> be **stapled** together[3], and **both** hard and soft copies must have, in the upper left corner of the first page:

        (a) your name
        (b) course number
        (c) section number
        (d) semester (e.g., Fall 2001)
        (e) date of submission, and
        (f) Honor Code declaration, with your signature.

Please note that I have no trouble remembering my own name. Therefore, you do <u>not</u> need to write my name on your homework assignments.

        Content of Submitted Work: All written work should be thoroughly professional in accordance with the highest standards. Your writing should be clear, should comply with the rules of grammar of the language in which it is written (for most of our courses, this will be English), as well as with good writing practice, and should be correctly spelled and punctuated and free of both slang and jargon.

        Late Submissions Policy: All work is due at the designated date and time. <u>**Normally, I do not accept late submission of homework.**</u> In order to reduce the need for a student to provide explanations or excuses for not submitting assignments on time or for missing a quiz, I drop the lowest homework grade and the lowest quiz grade.

Grading Policy:

        Overall Meaning/Definition of Grades: A grade of *A,* either on an individual assignment or for the entire semester, indicates work that is truly outstanding in the opinion of the instructor, demonstrating excellent mastery of the material covered. A grade of *B* indicates very good work, above the instructor's level of expectation for an undergraduate student. An undergraduate grade of *C* indicates work that is satisfactory, although not outstanding, demonstrating sufficient comprehension of the material to merit the student's receiving credit for achieving the course objectives. A grade of *D* indicates work less than satisfactory at the undergraduate level, but nevertheless sufficient to merit receipt of undergraduate credit for the class. A grade of *F* indicates work far below the minimum level considered to be satisfactory, demonstrating insufficient achievement in the skills or level of knowledge required even at the undergraduate level.

        Extra-Credit Opportunities. Grades are based only on assignments given to _**every**_ student in the class. Opportunities to earn extra credit may possibly be announced to the entire class at various times during the semester, but extra-credit assignments will NOT be custom-crafted for the sake of an individual student. Your best strategy is to learn the course material by conscientiously studying and doing your assigned homeworks _**throughout**_ the semester. If you wake up near the end of the semester and only then realize that you are in trouble, there may not by then be anything that you can do.

        Extra Tutorial Assistance: I will be pleased to provide extra help in most instances to any student who requests it. However, the student who needs help must **both:** (i) take the initiative on his/her own to seek me out, **and** (ii) seek help in a timely manner and not wait until the last minute, when the examination or assignment due date is already imminent. You must also understand that I am willing to help when your own assiduous efforts to

---

[3] If you do not own a stapler, there is one available for student use in the Copy Center (HHS Room 1002).

learn the material prove to be inadequate. I can**not** provide tutorial assistance to a student who cannot find the time to do the assigned readings and homeworks, nor for a student who is "too busy" to come to class.

        Quizzes and Examinations: There will be one in-semester examination (mid-term), and a final examination. In addition, there will be a relatively brief in-class quiz given approximately **bi-weekly** throughout most of the semester, except for the week when the Mid-Term Examination is given. The quizzes, as well as the Mid-Term and Final Examinations, will be based **both** upon the reading assignments, *regardless* of whether or not the readings were covered in class, that were due up to **and including** the date of the quiz or examination, **and** *also* upon the material covered in class up to the moment of the quiz or examination, *regardless* of whether or not the assigned readings also cover the same material. *Occasionally* a student may have a bad day and will therefore not perform on a quiz up to his/her level of knowledge. Alternatively, circumstances may come up either that prevent him/her from covering the day's assignment on time, or that preclude his/her attendance on the particular day when a quiz is given. In either case, this will result in a quiz grade below the norm for that student, or in an automatic grade of zero if the quiz is not taken at all, regardless of reason. To avoid excessive anxiety on the part of a student who experiences a rare bad day, and to avoid having to take up students' and instructor's time with the giving and adjudication of explanations and excuses, as a matter of policy the lowest **one** quiz grade for each student will be dropped. Students are warned not to use up their opportunity frivolously (e.g., don't miss class without grave cause). Preserve your allotment of one excused low quiz grade for circumstances of real need.

        Homework and Programming Assignments: There will also be several homework assignments, including one or more programming assignments. There will also be a term paper assignment.

        Class Participation: Vigorous student participation in class discussion makes for a much more lively and interesting class for all. To encourage participation in class discussion, the grading mechanism includes the opportunity for the student to earn a reward (details given below) for participating *both* **vigorously** *and* **constructively** in class. Note that your mere attendance can **not** considered to be "class participation", and will **not** be rewarded with class participation points. Attendance in class is **mandatory,** and therefore you will be given no rewards merely for attendance. However, your vigorous and constructive participation in class discussion will certainly make the class more interesting both for me and for your fellow students as well as for yourself, and this therefore can earn you "class participation points", which can *possibly* result in enhancing your grade, as well.

        Assignment of Grades: Makeup of overall grade for the semester will be as follows: First, a numeric score will be calculated based upon your performance on all the examinations, on the quizzes and homeworks, on the programming projects, and on the term paper.

<div align="center">The basis for calculating your grade for the semester is:</div>

Quizzes	20 pts
Mid-Term Examination	20 pts
Homework Assignments and Programming Projects	20 pts
Term Project	10 pts
Final Examination[4]	30 pts
TOTAL:	100 pts
Possible extra-credit opportunities to be announced, and participation in class discussion can earn extra points :	≤10 pts

---

[4] Please note that in the unlikely event that the university should close down because of inclement weather or for some other emergency, thus preventing the final examination from being held during the scheduled time, then I shall determine your semester grade based upon the remaining information at my disposal. **There will be no make-up** in this course of the final examination if it cannot be held as scheduled. Please see the "Course Map" for the date and time of the final examination.

After the numeric scores have been determined, letter grades will be assigned, based upon the distribution of the numeric scores. I make **no** commitment in advance regarding the letter-grade equivalent of specific numeric grades. The standard cutoff scores for grades are: 90 for *A,* 80 for *B,* 70 for *C,* and 60 for *D.* However, I reserve the right to lower the cutoff points in accordance with my judgment after studying the actual distribution of numeric scores.

Enhancement of Grades for Vigorous Class Participation: An initial assignment of letter grades is made to all members of the class as described above. After making the initial assignment of letter grades, I then dispense additional points to those students, usually few in number, who participated vigorously and effectively in class discussion. This may result in improvement of the grades for such students. Thus, your non-participation in class discussions will **not** lower your grade, but high-quality participation may **possibly** raise it.

Legibility and Clarity-of-Communication Requirements for Quizzes, Examinations, Homeworks, and Term Papers: It is up to you, the student, to demonstrate to my satisfaction that you have mastered the course material. I know that at the time of your birth you knew nothing about the subject matter of this course. If a change has occurred between then and now, then *you* must demonstrate through your performance on quizzes and exams that learning has taken place. Therefore, your writing and drawing must be clear and unambiguous, and your answer to each question should be obviously correct on its own, without benefit of any *post hoc* verbal explanation that you may provide of your answer. What this means is that:

(i) your handwriting must be legible <u>to me</u>;
(ii) you must, yourself, bear the burden of choosing the correct words and technical terms that answer the question;
(iii) your drawings must be neat, technically correct, and properly labeled;
(iv) your sentences must be properly structured, and paragraphs must be correctly and logically organized;
(v) you must thoroughly address **all** the specific issues raised by the question; and
(vi) for multiple-choice, fill-in-the-blank and other short-answer type questions, you are responsible for marking the answer in the correct place on the answer sheet. The grader will **not** be responsible for searching for the correct answer in other places, nor can credit be given after the fact for notations made on your question booklet that were not reflected in the answer marked on your answer sheet. Be careful, and check what you are doing. It can be very frustrating for student and instructor alike when a student who knows the material has to take a lower grade than he or she could have earned, because of the student's carelessness in marking the answer properly on the answer sheet. Nevertheless, Computer Science, like airline piloting, is notoriously unforgiving of mistakes, and minute attention to detail is one of the personal properties that the faculty tries to inculcate in our students.

Errors in Grading: Unclear answers will be marked **wrong.** Instructors are human and sometimes make mistakes, too. You are entitled to complain politely after class if you honestly feel that your answer is both clear and correct, but was misunderstood at grading time by the instructor. If the instructor agrees that a mistake was made, then your grade will be cheerfully corrected.

Rules for Examinations:

(1) No calculators, no books, no notes.
(2) The JMU Honor Code must be scrupulously observed.
(3) All work **must** be shown on your examination paper. You will certainly be given extra paper if you ask for it.
(4) You must provide exactly ONE answer to each test question. In the event that you should provide more than one answer, the answer that is **wrong** is the one that will be graded.

(5) All examinations **must** be taken at the scheduled time. If you miss the scheduled examination, you are responsible for providing **timely** documentation to support a medical or other *bona fide* emergency to avoid getting a grade of zero for the examination. Medical exemption requires certification from a licensed medical practitioner or facility. The documentation must be provided on the practitioner's letterhead and must be dated and signed by the practitioner, and must clearly certify the time range over which you were incapacitated. The practitioner's telephone number must also appear on the document.

Note that there is a deadline for submitting your documentation to support medical or other excused absence. The deadline is one calendar week after you return to class.

Homework Assignments:

Educational Philosophy: There are three ways for a student to learn complex technical subject matter, such as you will encounter in this course. First is by reading. Second is by coming to class and both watching and listening **interactively.** Third is by working selected problems and examples. This course has been carefully designed to integrate at least the first two, and perhaps all three modes of teaching and learning. There may be some material covered in the reading assignments that will **not** also be covered in the classroom, and there is other material **not** covered in the reading assignments that will be covered **only** in the classroom. Students will be held responsible **both** for the content of all assigned readings, *whether or not covered in class,* **and** also for all classroom material, *whether or not covered in the assigned readings.* To assist you in reviewing both the readings and the classroom materials, and in preparation for the examinations, review questions covering the main points may be provided, and in some cases answers as well. Students are **well advised** to answer review questions in writing, and, where applicable, also to work out solutions to assigned problems in detail before peeking at the answers. The reason for this recommendation is that in first crafting your own answers or your own solutions you will be much more seriously stress-testing your own level of comprehension of the material. Then, when you compare your own answers with those provided to you, you will gain much better insight into any deficiencies in comprehension that you may have. If you look at the answers first, it will go much faster for you, but you will suffer in the depth of learning that you will attain. I treat you as adult by providing the answers up front in some cases and by trusting you to use good judgment in working through the problems before consulting the answers. Please don't disappoint me.

Types of Assignments: Details of homework assignments for this course are specified in a separate document. In general, a homework assignment may have one or more of four components: readings, review questions, practical exercises, and reports (oral and/or written). Readings **must** be done on time, so that you will be properly prepared for, and get full benefit from the class. Review questions are also extremely important for you to answer prior to the class when they are due. In most cases, your answers to review questions will *not* be collected and graded, but these questions are excellent preparation both for quizzes and for the lengthier Mid-term and final examinations. Readings, review questions, practical exercises, and reports must all be completed no later than the scheduled due date and must be ready for submission on the due date at the beginning of class. Some or all of the homeworks will be collected. These will be graded **not** on the basis of whether the answers are correct, but merely on the basis of whether the homework was done completely and conscientiously.

Group Projects: One or more projects may be assigned during the semester. Any assigned projects, may be assigned either as individual projects or as Group Projects. Any project assigned as a group project **must** be done as a group project. Even if you prefer to work by yourself and are willing to do by yourself all the work required for the project, you must nevertheless join a group to work on any project designated as a group project, and you must also participate as a full partner with your fellow-students in the group. Group members are **advised** to exchange **both** telephone numbers **and** E-mail addresses immediately upon formation of the group, to facilitate inter-member communication (this is a ***recommendation,*** not a requirement). Each member of the group is responsible for

cooperating fully with the other members of the group, and for doing his/her full agreed-upon share of the work *in concert with* the rest of the group. For every group project assignment, the group is required to deliver, along with their written project report, a written ***Work Breakdown*** statement, indicating precisely what contribution each member of the group made to the overall project.

Policy Regarding Classes Missed by Students:

In the university environment, there is an implied contract between students and faculty. You (students) expect us (faculty) to come to class. I, as a faculty member, also expect all of my students to come to class. Occasionally, you may find it necessary to miss a class. If you must miss an occasional class, I trust you, as a responsible adult, to do so only for adequate reason. Therefore, in general you do not need to seek my permission before skipping a solitary class, nor do you need explain afterwards why you were absent. Please note, however, that I do look particularly askance at students who miss the last class prior to a vacation period and/or the first class after vacation. The university is very generous with scheduled vacations, and I expect you to make do with the allotted vacation days and **not** to take for yourself an extension of your vacation period beyond what the university has generously scheduled for all students and faculty. Airline tickets can usually be procured for travel ***during*** the scheduled vacation period, if they are purchased sufficiently in advance. In the event that you are unable to obtain a ticket without committing yourself to straying into the time scheduled for classes, then I invite you to make alternate plans and to spend your vacation closer to Harrisonburg.

If you have missed the class for good and valid reason, nevertheless you **are** responsible for making up the work you missed, as well as for complying with any announcements, directives, or instructions that might have been issued during the class that you missed. Therefore, it is up to **you** both to find out what was covered or announced, **and** to make up in a timely fashion any missed work.

You would be wise to prepare, as early as the very first day of the semester, for the possible occurrence of sudden brief acute illness (tummy ache, head ache, etc.), or of other, non-medical emergencies, such as a flat tire, traffic jam, family emergency, or the like. I **<u>strongly</u>** suggest that you exchange phone numbers and E-mail addresses on the first day of class with several of your classmates. If at all possible, give notice to one of your colleagues prior to the class you will miss. Follow up as soon as possible after the missed class, so that you will be able to stay abreast of what is happening in class. Also, if you know in advance that you must miss a class, you should arrange to have someone hand in for you any assignments you may have done that are due that day. If you did not make advance arrangements, then it is even more important both that you follow up rapidly to find out what you missed and that you make up for missed work.

Please do **not** send me E-mail, either asking in advance of the class you must miss what do I intend to cover, or querying me subsequently to the class on what did I cover. I teach many students each semester, and I just don't have the time to answer a blizzard of "What will I miss?" and "What did I miss?" E-mails. In the fortunately rare case that a student encounters a serious health problem or a serious issue in his/her personal or family life that spans several consecutive classes, it is my experience that I have almost always been able to make a special accommodation to try to help the student through the crisis, and I will certainly make every effort to do so in the future, as well. But I must insist that you take care of the onesies and twosies on your own.

Class Meetings:

Classes meet during the Spring 2008 semester on Tuesdays and Thursdays from 1530 to 1645 hrs in HHS 2208.

Instructor:

[Dr. Charles Abzug](#)

Revised 08 Jan 2008

© 2008 Charles Abzug