



## CS334 Advanced Introduction to Computer Organization and Architecture

Spring 2012

Lecture: 3 Hours, 3 Credits

INTERNET BASED	31965, 67,68,70,71,74, 35031	8:30-10:00	Fri	Gornto
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**Office Hrs:** Posted and regularly updated here: [boyle home](#)

- You should check the website for updated office hours

**Course:** <http://www.cs.odu.edu/~cboyle/cs334/>  
<https://www.blackboard.odu.edu>

**This is NOT a standard normal course. This course is INTERNET BASED.** The course satisfies both the CS170 and CS270 requirements for the BSCS degree at Old Dominion University.

### Lecture 4 hours; 4 credits

Topics include: number representation, base conversion, Boolean algebra, combinatorial circuits, arithmetic units, registers, memory, hardwired and microprogrammed control units, architecture of typical microcomputers, and the development of systems from basic components. The performance of competing architectures will be a major concern. This course satisfies the requirements of both CS 170 and 270. This web-based course requires considerable maturity and independent responsibility on the part of the student.

**Prerequisites:** 1. CS150 or an equivalent course in a high level language 2. MATH 163 or equivalent

Students will need to have prior programming experience as well as being prepared in mathematics at least through pre-calculus. The background requirement is firm as many of our explanations will be in terms that will only make sense to those with programming experience and we will also assume the students are proficient in algebra. Students must be comfortable using the Internet, e-mail and software, including a word processor. Students must be highly disciplined and motivated in the art of self-learning. This includes being able to efficiently read, absorb, and retain new information, as well as being fully capable of studying and understanding new concepts and technical ideas in a timely and independent manner.

### Course dynamics, attendance & conduct

This is a hybrid course. It will contain far fewer hours of lecture than a normal course. Those lectures will be televised live at your site of registration and by video streaming. The lectures will also be available for replay by video streaming for review purposes. The lectures and the materials on the web are meant as a supplement to the text which is the primary source of material for this course. Most of the direct communication between the instructor and individual students will be by email or telephone. The student will have to initiate this contact as needed, I will normally respond to email within 48 hours Monday through Friday. With regards to attendance, you are not required to attend but you are responsible for material covered in your absence. You should view any lecture missed by using the video stream archive.

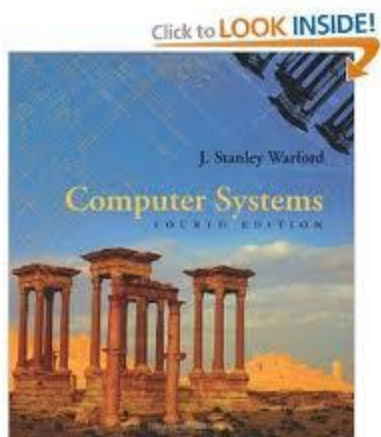
## Course Topics:

This course consists of five parts covering the chapters of our textbook with respect to the layered abstract computing model introduced within the preface (and further illustrated in the course map available on the course web site).

Further we will evaluate hardware performance. In order to do this we will study binary and hexadecimal numbers, data representation and performance metrics as well as Amdahl's Law. Prior exposure to C++ is assumed or required. We will study, understand and be able to describe a von Neumann Architecture at various levels included in our studies, including application programs, C++ level (high level languages), assembler language level, machine language level, and gate level. We will study and understand the CPU algorithm and the control process necessary to implement it. Study information representation in terms of binary and hexadecimal number systems, data representation at various levels of abstraction and performance metrics and hardware performance.

## REQUIRED MATERIALS

Textbook: Computer Systems by J. Stanley Warford, Jones and Bartlett Publishers, 4<sup>th</sup> edition.



### Grading

Homework Assignments :	10 %
Quizzes:	10 %
Exams (4 total)	
Exam 1	20 %
Exam 2	20 %
Exam 3	10 %
Exam 4	30 %

### Grading Scale

There will be no '-' grades given. The grading scale is as follows:

1 The percentages listed are only approximate and are subject to change (by no more than 10%).

90-100	A
87-89	B+
80-86	B
77-79	C+
70-76	C
67-69	D+
60-66	D

## BlackBoard

- We we will use the BlackBoard site for this course actively throughout the semester.
- I will post important announcements on our Blackboard site,
- Use the Blackboard discussion forum to post questions of a general manner, and to help other students in the class. Please participate in class and in the forums.

## Academic Integrity

By attending Old Dominion University you have accepted the responsibility to abide by the honor code. If you are uncertain about how the honor code applies to any course activity, you should request clarification from the instructor. The honor code is as follows:

***"I pledge to support the honor system of Old Dominion University. I will refrain from any form of academic dishonesty or deception, such as cheating or plagiarism. I am aware that as a member of the academic community, it is my responsibility to turn in all suspected violators of the honor system. I will report to Honor Council hearings if summoned."***

Any evidence of cheating will result in a 0 grade for the assignment/exam, and the incident will be submitted to the department for further review. Evidence of cheating may include a student being unable to satisfactorily answer questions asked by the instructor about a submitted solution. Cheating includes not only receiving unauthorized assistance, but also giving unauthorized assistance. For class files kept in UNIX space, students are expected to use UNIX file permission protections (chmod) to keep other students from accessing the files. Failure to adequately protect files may result in a student being held responsible for giving unauthorized assistance, even if not directly aware of it. Submitting anything that is not your own work without proper attribution (giving credit to the original author) is plagiarism and is considered to be an honor code violation. It is *not acceptable* to copy written work from any other source (including other students), unless explicitly allowed in the assignment statement. In cases where using resources such as the Internet is allowed, proper attribution must be given.

Students may still provide legitimate assistance to one another. You are encouraged to form study groups to discuss course topics. *Students should avoid discussions of solutions to ongoing assignments and should not, under any circumstances, show or share code solutions for an ongoing assignment.*

Please see the ODU Honor Council's webpage at <http://orgs.odu.edu/hc/> for other concrete examples of what constitutes cheating, plagiarism, and unauthorized collaboration. *All students are responsible for knowing the rules.* If you are unclear about whether a certain activity is allowed or not, please contact the instructor. **The honor code will be strictly enforced.** To see the honor code and the definition of cheating go to <http://orgs.odu.edu/hc/>.

Collaboration on homework is permitted and encouraged in this course. You may also use information from properly documented outside sources to develop your answers. However you are personally responsible for creating and understanding documents that you submit for credit.

## Homework/Assignments policy

### Late Assignment Policy

Any assignment submitted after its deadline is considered late. Assignments that are submitted late will not be graded, and no credit will be awarded for a late assignment.

Homework/Assignments are to be submitted as instructed - typically via Blackboard, before the due date. To be clear: **Late submissions will not be accepted.**

Quizzes are administered via Blackboard. Quizzes expire on the due date, and cannot be taken after they have expired and become unavailable.

### **Communication /EMAIL**

Students should activate their Old Dominion e-mail accounts and check them every day. If a student chooses to have his/her messages forwarded to another account, it is the student's responsibility to take the necessary steps to have them forwarded.

- Our primary means of communication will be via email or on the blackboard forum.
- You must use your University email to contact me. The instructor will not respond to email other than your official ODU student email account.
- You must include your course name and number in the subject line of your email. This will allow me to identify who you are, what class you are in, and answer your question quickly.

### **Make-ups**

Make-ups for graded activities may be possible *only* with a valid *written* medical or university excuse, and then only at the instructor's discretion. It is the student's responsibility to give the instructor the *written* excuse and to arrange for any makeup work to be done. A makeup exam may be different (and possibly more difficult) than the regularly scheduled exam. You are encouraged to inform the instructor of conflicts ahead of time, so that alternative arrangements may be arranged (ahead of time) if possible.

### **Disability Services**

In compliance with PL94-142 and more recent federal legislation affirming the rights of disabled individuals, provisions will be made for students with special needs on an individual basis. The student must have been identified, as "special needs" by the university and an appropriate letter must be provided to the course instructor. Provisions will be made based upon written guidelines from the University's Special Needs Students Resource Office. All students are expected to fulfill all course requirements.

### **Seeking Help**

The course Blackboard website should be your first reference for questions about the class. The schedule will be updated throughout the semester with links to lecture notes and assignments. Announcements and frequently asked questions (FAQ) will also be posted to the course Blackboard site.

The best way to get help on assignments and in understanding lectures is to read, and re-read the required textbook for the course.

Especially because of the internet based nature of this course, you need to formulate and articulate intelligent questions ahead of time.

You can also seek help during posted office hours. If you cannot make office hours, please send an email to setup an appointment. *Unfortunately, I am not able to take "walk-in" questions outside of office hours.*

I am available via email, but do not expect or rely on an immediate response.

Since this course will include several concrete deadlines, in terms of homework assignments and Exams, here's a word of advice – ***start working on assignments early!*** *An hour spent reading and understanding an assignment on the day it is given out will be worth many hours on the night before it is due. Patiently working your way through the chapter, and then re-reading it to solidify your understanding will be more helpful than cramming multiple chapters into your brain for an exam on the last day.*

### **General Course Information**

The Driving Principle for this course is provided as a quotation from my esteemed colleague Dr. Larry Wilson, who previously taught this course: "The one who does the work is the one who learns. I prefer for students to learn as much as possible hence they must work." This course is Internet based, and demands a much more disciplined, mature, and motivated student than standard delivery lecture courses. The equivalent of

six credit hours of material will be covered. No effort will be made to condense or abbreviate the material covered in CS170 and CS270. The time commitment required for a good student to be successful in this course will be in the range of 15-20 hours per week. If working full time this may be the only course you can handle. Be sure to budget twice as much time for this course as for a normal course.

The delivery mechanism of this course may be new for many students. It is heavily dependent on technology. You must be prepared to handle minor glitches without becoming overly upset. Every reasonable effort will be made to minimize the problems. A certain amount of overhead for adapting to this nonstandard delivery system is expected. Most of it will occur at the start of the course but equipment failure, software problems, power failure and human errors may cause temporary problems at any time during the semester. Be prepared to use your time wisely by reviewing old material and/or reading ahead if something prevents you from working on the preferred task. I will endeavor to post as much material ahead of time as possible.

We will meet only four times to coordinate current material and possibly introduce new material. You will also need to come to your TTN site four times to take exams. Meeting times and exams will be announced in advance. The meetings will be available by television at the TTN (TELETECHNET) site at which you registered and by live video streaming for those registered for video streamed sections. They will also be available on VCR tapes and video streaming archives for review of missed sessions. You will also want to use the tapes or archives for review purposes.

Guidance and technical material will be made available for your access via the Internet. These will range from simple reading assignments to written material designed to supplement the text. Certain important aspects of the course will be illustrated by a flash video that is available online. Also in some cases we will add material to the text for more complete coverage.

Student Attributes: Students with the following attributes should be successful in this course.

- The ability to *read*.
- The ability to *learn by reading*.
- The *discipline* to set aside time for study.
- The *ability to do mathematics well at the pre calculus level*.

Those with the following attributes are advised to reconsider their options before taking this course.

- *Needing detailed explanations* of all new technical material.
- Not able to *learn by reading* on your own.
- Lacking the *discipline and motivation* for setting and maintaining your own schedule.
- Less than a B average in mathematics.

Hardware/Software Needs:

Distance learning has provided us with a web site that describes the hardware and software necessary for live video stream access. <http://dl.odu.edu/tools/vstream/index.shtml>

You must have this access in order to view the video streams live and/or to review the video stream archived sessions.

Modules: This course will be organized into five modules with modules further divided into components. Roughly we will cover one component per week. The early modules contain review and basic material necessary to do the later modules. If you are not doing well at mid-term you are advised to withdraw with a

'W' grade at that time. After that date I will be willing to consider incomplete grades and/or late withdrawals only for exceptional circumstances and only for those who were doing well at mid-term. If your work is below a C level at mid-term then you continue at your own risk.

Suggested Study Habits: Go to the schedule and follow the link to the appropriate module or component. It will be to your advantage to do them in the order suggested. Be aware that there is work to be done prior to the first class meeting. For best results get ahead and stay ahead. In fact one could do all the work prior to the first class meeting and then just review from time to time to prepare for the tests.

Read each module and follow the instructions there. Study the material in the modules themselves as well as the material from the text as you are responsible for everything. You should expect to read material multiple times in order to learn it. We all do that in order to learn new material.

Read/study with pencil and paper in hand to work out the math problems and make notes for your later use. Somehow just writing down information helps it to stick in our heads. Particularly math examples are easier to follow if you do the work on your own paper rather than just trying to read and absorb it. You will save time and effort by doing this and the results will amaze you.

Do all the homework assigned not just the ones to be turned in for grading. It is probably faster to do them all in that like many texts the problems get progressively tougher as you move forward in the list, so the training you get on the easy ones will help you on the harder ones. Also you may see some of these problems on tests and if you have not previously had enough drill work then you may have problems with time. There is some drill built into these assignments if you are really good they will not take long and if you are not then the drill will make a big difference. I will collect and grade only a few selected problems to give you some feedback. You are expected to do them all. If you do them all and study until you understand all of them then you will learn a great deal of information from this course. If you decide not to study until you master the material then you can expect to have problems with test and with the subsequent material.

The problems marked with an \* in the text have answers in the back. Work them out and then confirm your answer. Often the problems near these are very similar to those with the \*s. Your immediate goal is to understand all of the assigned problems and their solutions prior to the tests.

An even more important long-term goal is to develop your ability to solve new problems quickly. If you find problems that are particularly tough after devoting a reasonable amount of time to them feel free to ask in class or by email. Do not waste my time and yours by asking questions about problems that you have not made a proper effort to solve, including reviewing the text and lectures to master example problems of a similar nature.

Keep up with the schedule. If you get behind there is not likely to be time to catch up. This will require multiple study periods per week. If you do this then when a test is scheduled all you will need to do is to review the material that you have already learned and then use your knowledge to earn your 'A'.

Pay attention in class and use the tapes and video streamed archives to facilitate your understanding of the material. You are responsible for all material presented in class.

**NOTE:**

This syllabus and the course schedule posted on Blackboard are tentative and subject to change. Changes and Announcements will be made via email, and in class.