CS 261: Computer Systems I
James Madison University, Fall 2017 Semester, 3 Credits

Home Page: http://w3.cs.jmu.edu/weikleda/cs261f17

Class Times
T/Th, 3:30 – 4:45 Final Exam: Thursday, Dec. 14, 1-3

Location: ISAT/CS 246

Your Instructor

Dr. Dee A. B. Weikle
weikleda@jmu.edu
Office: ISAT/CS 205
Phone: 540-568-5013

Office Hours: T 9-10, W 2-4,
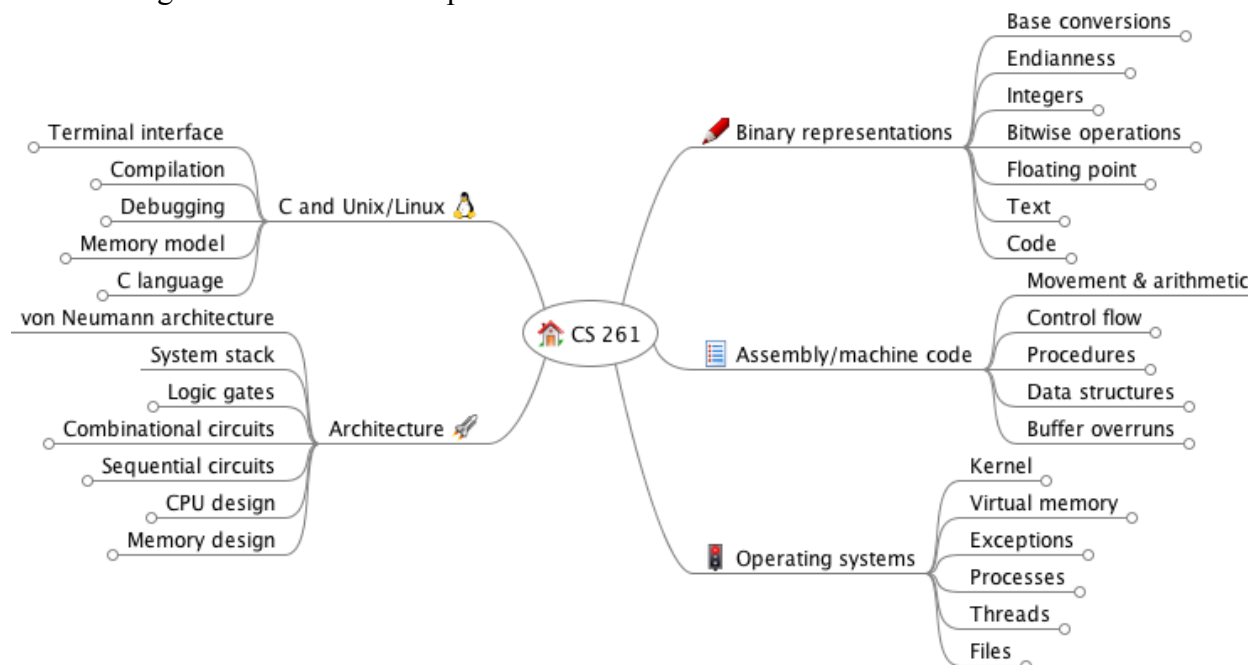   F 2:30-4:30
(no appointment necessary)

Other times are available by appointment via email. You are welcome to stop by if my office door is open without an appointment and if I have time I will help you. I will rarely be in the office on Mondays though.

Goals and Objectives
This course provides a solid theoretical foundation of the design and implementation of modern digital computers. Mastery of this material allows students to develop a more sophisticated view of computing and the power of high-level software abstractions. Students who complete this course can expect to meet the following objectives:

1) Explain the machine-level representation of data and code
2) Summarize the architecture of a computer
3) Explain how powerful, complex systems can be built from simple logic circuits
4) Translate high-level code blocks into assembly and machine language
5) Write code to emulate the functionality of a computer
6) Cultivate a sense of power and control over computer systems
7) Gain an appreciation for the tools that facilitate software development
8) Develop a sense of play when writing code
9) Appreciate the principles and complexity of systems-level software.

Here is a high-level view of the topics covered in this course:

Catalog Description

Introduction to operation of modern interrupt-driven computer systems. Explores the representation of software and information in binary memory, the primary components of a CPU, multithreaded programming, and basic interactions with an operating system.

Prerequisites: Grade of 'C-' or better in CS 159

Methods of Instruction

If you're hoping for lectures day after day, you've signed up for the wrong class. Research has shown that active learning methods are more effective than passively taking notes. While we do not have a full set of POGIL activities or flipped classroom labs for every session of this class, we do have some and I will be creating additional ones. Other faculty who have taught this class sometimes use Peer Instruction, another active learning technique that we may at times use. Bottom-line – come to class prepared and ready to learn as much as you can in class. This will make most efficient use of your time.

For this class, there is no specific weekly routine, although you will likely have reading, a quiz or unit test and a programming assignment in addition to labs to work on every week. Please watch Canvas and your email for due dates. I will work very hard to make sure that you have timely notification and access to all material, but in the end, it is your responsibility to make sure you get your work done. I am very happy to take suggestions or to have discussions with you about time management if that is helpful.

Please note:
• In a three-hour course, you should expect six hours of homework per week. This class notoriously takes more time. This is in part because the material is VERY different and usually

completely new. However, if you keep up by coming to class and participating along with making sure you understand the concepts well as you go along it is very doable.
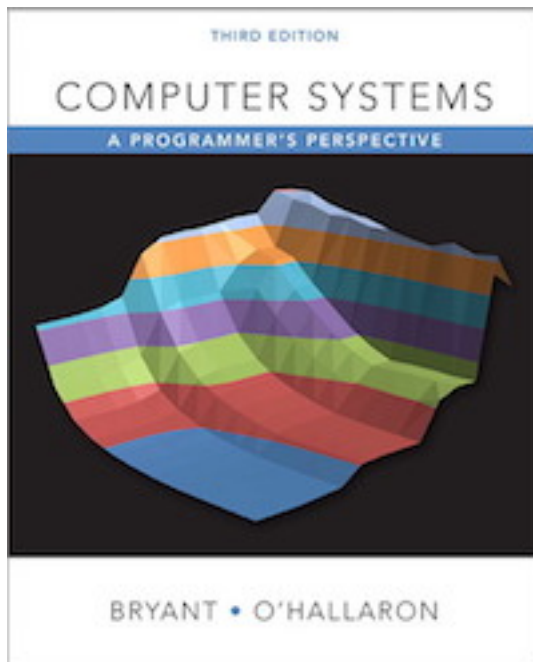
• Programming assignments (PA) can take students a long time to complete; the course is more advanced conceptually than cs149/159 and we now expect you to learn on your own. Start immediately. You will have questions and we are available, but there are no longer TAs so make sure you have time to ask questions (Piazza is your friend! As Dr. Lam likes to say – literally.)

• While I will answer Piazza questions over the weekend, you should realize I may not answer in the timeframe you need. If you choose to complete assignments at the last minute you have significantly decreased your chances of successful completion. I will make sure any questions posted over the weekend are answered on Monday at the latest. Please ask questions using Piazza first if at all possible. I have it set up so that I get an email when a question is posted to Piazza, so emailing me is not quicker and by posting to Piazza. Also, you will have a chance of being answered by a classmate or Dr. Lam. Email should be reserved for questions whose answers would only benefit you personally or only I would know the answer to.

Required Textbook
Course Textbook
Computer Systems: A Programmer's Perspective (required)
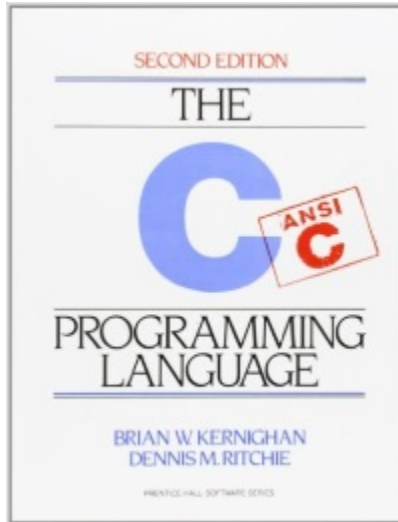Randal E. Bryant and David R. O'Hallaron

CS:APP is a very practical introduction to computer systems. It covers a wide range of low-level topics, some of which we won't cover this semester but which you will either see in later courses or will encounter at some point in your career.

Recommended Textbook

Textbook Cover
C Programming Lanuage, 2nd Edition (optional)
Brian W. Kernighan and Dennis M. Ritchie

This is the classic "K&R" book on the C language, written by people who were intimately involved with the development of the Unix operating system and the C language. It holds up surprisingly well and is an excellent reference and tutorial on C. This book is also available online through JMU's subscription to Safari books.

Online Interaction

If you need to schedule an appointment or have a personal inquiry, don't hesitate to email me directly. However, do not send me messages via Canvas—I have disabled its notifications. Please bookmark the following websites:

• https://w3.cs.jmu.edu/weikleda/cs261f17/
The detailed schedule page on the course website will provide links to activities, labs, readings, videos, and assignments. This should be available by the end of the first week.

• https://canvas.jmu.edu/
We will use Canvas primarily for submitting quizzes and labs, posting solutions, and communicating grades. I intend to have the majority of materials available on the website above, but Canvas will point to those web resources and have the precise due dates. Canvas dates override any discrepancy with the posted web dates. If something seems odd – please email.

• https://piazza.com/
If you have questions about course content or assignments, post them on Piazza (see Canvas for link) rather than email me or Dr. Lam directly. This will help significantly in getting a timely answer as more people might answer. I get email automatically when a question is posted to Piazza.

• Eclipse and Command Line

jGRASP is an independent development environment that you can use to develop your code and programming assignments. You will also need to be able to quickly use the command line and navigate in a Linux operating system environment for managing files, compiling etc. This is a tremendously useful skill that will almost certainly be with us for a long time. It is one of the few things that hasn't changed much since my undergraduate days in the early 80s.

Methods of Evaluation

All sections of CS261 are using the same methods of evaluation. As a result some decisions will require a discussion with the other faculty member.

You are responsible for all material discussed in lecture and discussion section and posted on the class web page, including announcements, deadlines, policies, etc.

Your final course grade will be determined according to the following percentages:

Reading Quizzes	10%
Group Labs	10%
Programming Projects	40%
Online Unit Tests	20%
Written Exams	20%

Final course letter grades may be adjusted at the end of the semester based on each student's overall performance for all coursework, but in general a normal letter grade distribution will apply: above 90% A, above 80% B, etc. Other factors that may influence a +/- grade are your general performance trend over the semester (improving or degrading) and your general investment in the course (attendance and participation). These are aspects of the course for which formal grades are not given, but they may factor into your final letter grade assignment.

If you believe I have made an error while grading your work or calculating your final score, please bring it to my attention after class or during office hours and as soon as possible. I never get angry about this. If I determine that there has been a simple mistake, I will fix it immediately and no formal request is necessary.

If you believe an exam question or assignment has been graded unfairly, you must submit a verbal or written formal request for a regrade. Such requests must be submitted within one week of when the assignment in question is returned to you. Any coursework submitted for reconsideration may be regraded in its entirety, which could result in a lower score if warranted.

Completing the programming assignments is an essential part of the course. Therefore, we reserve the right to fail any student who does not make a good-faith attempt on all course projects, regardless of the student's performance or scores on the other coursework.

Attendance and Participation

Class activities called labs and concept quizzes will include a graded component. They will have due dates dependent on the content and may be due at the end of a class period in which they are

assigned. You are encouraged to work with other students on these types of assignments. ***In general, no credit will be given for labs if you are not in class, but you should still complete them to learn the concepts***.

You must attend class during the first week of the semester in order to "claim" your seat in the class. To assure that the maximum number of students can benefit from the course, I reserve the right to drop any student who does not attend the first two classes of the semester. This frees up seats for students on the waitlist. If you have mitigating circumstances (i.e., health or travel issues) that prevent you from attending a class the first week, please notify me BEFORE that class time.

After the first week, attendance is not mandatory, and I generally do not give grades purely based on attendance. I view my students' time as valuable, and my goal as a teacher is to make class attendance and participation well worth the time investment for you. I strongly encourage you to attend every class session and participate fully in order to derive the maximum benefit of this course. If you believe that there is something I could change about the way I am handling the course in order to improve its effectiveness for you, please let me know via email or office hours. Please note that I reserve the right to give graded quizzes or group work in class unannounced.

Programming Projects

Projects must be submitted electronically following the instructions given in class and on the website. Projects may not be submitted by any other means (e.g., do not email your projects to me unless I request that). It is your responsibility to test your program and verify that it works properly before submitting it.

All projects are due at 23:59 (11:59pm) on the day indicated on the project assignment unless noted otherwise.

Projects may be submitted up to 72 hours late for a letter grade penalty per 24-hour period. For example, a submission that would have earned an "A" in an on-time submission will earn a "B" if submitted up to 24 hours late, or a "C" if submitted up to 48 hours late.

Project extensions will not generally be granted due to server congestion, system problems, network problems, power outages, etc., so do not wait to submit a project until the night it is due. No consideration in grading will be made for errors made in transferring files or submitting the wrong version of your project. Having a working, non-submitted version will not count; only submitted code will be counted. I strongly urge you to use version control software and/or keep redundant backups of your work to avoid data loss.

You will be responsible for developing your own techniques for testing your projects before submitting it. I may grade your projects based on test cases not provided to you in advance. Because grading may be done automatically, you must follow the project specification exactly.

Your code will be graded on a combination of correctness, completeness, documentation, and code style. If you have any questions as to what constitutes good documentation or code style, be sure to ask ahead of time or refer to the provided style guide.

Any "hard coding" in a project assignment will result in a score of zero for that project, and is considered a bad-faith effort. Hard coding refers to attempting to make a program appear as if it works correctly, when in fact it does not. One example of hard coding would be printing the desired output instead of computing it. If you have any questions as to what constitutes hard coding for a particular assignment, be sure to ask ahead of time.

Academic Honesty

You are expected to comply with the JMU Honor Code as stated in the Student Handbook and available from the Honor Council website on all assignments, projects, and exams.

Consulting with other students about problems and solutions is not necessarily a violation of the honor code, depending on the particular assignment. All final work turned in for an assignment must be your own unless it is a group project. In particular, you may not share any source or binary code on programming assignments unless the project specification explicitly allows it. This includes but is not limited to: direct file copying, detailed verbal descriptions, screen captures, and photos. If you are in doubt, please contact me immediately.

If I find evidence of a violation of the honor code, I will bring the matter to the attention of the involved individuals via email and request a face-to-face meeting. As per section IV of the honor code, first time student offenders may agree that a violation has occurred and accept an appropriate penalty by submitting an "Informal Resolution Agreement Form" to the honor council. If the student is not a first-time offender or if there is disagreement about the violation or penalty, the matter will be referred to the honor council under section V of the honor code.

University Policies

Adding/Dropping
You are responsible for enrolling in courses and verifying your schedule on MyMadison. The deadline for adding or dropping a semester course on MyMadison is Thursday, 09/14/2017 (signatures are required after Tuesday, 09/05/2017). The last day to withdraw from a course with a W grade is Thursday, 10/26/2017.

Disability Services
If you have a documented disability and need accommodations in this course, please register with the Office of Disability Services (http://www.jmu.edu/ods, Student Success Center, Room 1202, 540-568-6705). They will provide you with an Access Plan Letter to verify your need for services and make recommendations for the course. I will be happy to discuss your access plan with you. I highly recommend that if you had accommodations in high school that you document that immediately. It will likely help you learn better and have a more successful college experience.

Excused Absences

Students who are unable to attend class due to JMU sponsored activities (such as sports, band, academic competition, field trips, etc) or personal religious observances may request reasonable accommodations. Please notify me during the first week of class regarding potential absences so that we can determine alternative methods for you to complete the required work. Since I will post all deadlines and work, I expect you to have access to all materials necessary without coming to see me when unavoidable absences occur. You are however encouraged to stop by and get whatever assistance and perspective might be beneficial.

Excused absences will be granted at my discretion and only with appropriate documentation. Please contact me as soon as possible if you wish to request an excused absence.
The policies for excused absences do not apply to in-class activities (which cannot be made up) or project assignments. Projects will be assigned with sufficient time to be completed by students who have a reasonable understanding of the necessary material and begin promptly. In cases of extremely serious documented illness of lengthy duration or other protracted, severe emergency situations, I may consider extensions on project assignments depending upon the specific circumstances. Please contact me as early as possible if you believe you will need such an extension.

University Closings
For severe weather and other unexpected circumstances, watch for announcements relating to make-up work. See http://www.jmu.edu/JMUpolicy/1309.shtml for JMU's cancellation policy. Although the schedule may adapt to canceled classes, **assignment deadlines rarely change**. Also, since I live in Crozet, an hour away. Many students think that I will not come in inclement weather. I often stay in Harrisonburg if snow or other weather may keep me from teaching or another faculty member will substitute for me. So, follow the university closing information!