

## CPS101 - DECODING COMPUTER SCIENCE

Professor: Russell C. Bjork  
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Office: KOSC 242 x4377  
Hours: MWF 2:10-3:10 pm; Tu 1:30-4:30 pm  
and by appointment  
Course Site: Blackboard site

Fall Semester, 2018  
TR 9:45-11-20 AM;  
Classes in KOS 124;  
Hands-On Experience  
sessions in KOS 118

### CATALOG DESCRIPTION:

An introduction to the fundamental principles of Computer Science from bits to artificial intelligence for non-majors. Computation as a tool for solving problems, and computational thinking as a way of approaching problems in algorithmic terms. Application of computational thinking to problems arising in a broad variety of disciplines.

### COURSE OBJECTIVES:

Upon completion of this course, you will be able to:

1. Discuss key principles of computational thinking: abstraction, data representation, algorithmic computation, iteration and recursion,
2. Describe the structure of the modern web of networked computers
3. Make simple use of some key tools for automatic computation: programming in python, shell operations, sql and html.
4. Discuss some major areas of computer application today, including one(s) appropriate to the student's major field of study.

**TEXT:** Dale, Nell and John Lewis. *Computer Science Illuminated* 6th ed.  
(Burlington, MA: Jones and Bartlett, 2016).

### COURSE TECHNIQUES AND PROCEDURES

This course will combine study of theory with practice through textbook exercises and “hands on” experiences.

Class sessions will include a discussion and amplification of the material in the text and the presentation of further examples and supplementary material. You should not expect to grasp everything presented in the text when you first read it; however, you should note areas that are unclear to you and be prepared to raise questions about them in class.

The only way you can really learn computational skills is by doing them. For this reason, you will have opportunities to practice what you are learning.

## COURSE REQUIREMENTS AND EVALUATION:

The college has adopted the following statement regarding work expectations for courses; "For each semester hour of credit, students should expect to spend a minimum of 2-3 hours per week outside of class in engaged academic time. This time includes reading, writing, studying, completing assignments, lab work, or group projects, among other activities." Since this is a 4-credit course, this translates of 8-12 hours per week outside of class.

1. You will be expected to read most of the text as assigned in the schedule below. Reading assignments should be completed BEFORE the class hour in which the topic is discussed, as specified in the schedule below, and there will often be a short reading quiz on the days reading is due. (Reading quizzes will be worth a total of 5% of the final course grade. The lowest two scores will be discarded. Missed quizzes cannot be made up - except in case of a documented absence for unavoidable circumstances. If you are late for class on the day a reading quiz is given, you will miss the quiz.) However, our classroom discussion will not rigidly follow the order of material in the text, nor will it be confined to material covered there.
2. You will do daily assignments drawn mostly from the exercises at the end of each chapter. In total, these will be worth a total of 30% of the final course grade. Credit for exercises will be awarded on the basis of the completeness and correctness of your solutions, with significant credit given for a reasonably complete attempt at solving each problem, even if the final answer is not correct.

The following guidelines should be observed when doing exercise assignments

- Exercises will be due at the start of class on the due date. **Late exercises turned in up to one class late will be accepted with a 20% late penalty; after that date, exercises will NOT be accepted** unless an extension is granted (see policy on extensions below.)
  - Exercises should be done on one side only of 8-1/2 x 11 paper, and pages should be stapled in problem-number order. Problems must be numbered, and final answers (where appropriate) should be highlighted. (Homework not conforming to these standards may be returned ungraded.)
  - You may work together with another student on exercises, provided each of you works on each problem.
3. Several class sessions will be devoted to hands-on experiences using various software tools. Assignments for these will be posted on Blackboard ahead of time, and **must** be read over carefully **before** coming to the session. In some cases, you may be explicitly directed to study certain material in preparation for the experience. There will be a formal writeup to turn in. There may also be a quiz given at the start of the session (based on your reading of the assignment and any assigned preparation) and/or a quiz based on the work done in the session given when you complete the experience. In total, experience writeups and quizz(es) will account for 20% of the course grade. The tentative experience emphases are shown in the course schedule.

4. You will research a computer application relevant to your academic major (or a potential major), will prepare a paper describing it, and will briefly present it orally to the class. The paper and presentation will account for 5% of the final course grade. (Detailed requirements will be distributed later in the semester).
5. A mid-term examination and a final examination (each worth 20% of the final course grade) will be given as shown in the course schedule. Each exam will assume familiarity with material in the text, covered in lecture, assigned exercises and/or used in experience sessions. Exams will be open book (course text only), open notes.
6. Your final grade will be computed on the basis of a weighted sum of the items listed above.

Summary: Reading Quizzes	5%
Exercises	30%
Hands-on Experiences	20%
Computer Application paper/presentation	5%
Exams	<u>40%</u>
	100%

The following are minimum guaranteed grades for the percentages indicated:

	93% - 100%: A	90% - 92.9%: A-
87% - 89.9%: B+	83% - 86.9%: B	80% - 82.9%: B-
77% - 79.9%: C+	73% - 76.9%: C	70% - 72.9%: C-
67% - 69.9%: D+	63% - 66.9%: D	60% - 62.9%: D-

### **ACADEMIC DISHONESTY**

From the Gordon College Student Handbook: "Academic dishonesty is regarded as a major violation of both the academic and spiritual principles of this community and may result in a failing grade or suspension. Academic dishonesty includes plagiarism, cheating (whether in or out of the classroom) and abuse or misuse of library materials when such abuse or misuse can be related to course requirements." Note that "finding" solutions to exercises on the web is a form of cheating. For the purposes of this course, abuse or misuse of Gordon computer systems or networks related to course requirements will also be viewed as academic dishonesty.

Academic dishonesty will not be tolerated. You know better. Just don't!

### **POLICY STATEMENT ON EXTENSIONS AND INCOMPLETES:**

1. Extensions of the due dates for exercises MAY be given in the event of extenuating circumstances (such as illness, personal emergency) IF you submit a brief written request to the professor as soon as possible after the circumstances arise.
2. A grade of Incomplete MAY be given without penalty IF you are unable to complete the course work by the last day of the term due to major illness or other similar emergency. You must apply for this using the form provided by the registrar. Such a request will only be granted if you are substantially up-to-date with your course work and were making good progress in the course up to the time that the difficulty arose. Of course, you must complete all work for the course by the midpoint of the next semester in accordance with College policy.

## **ATTENDANCE POLICY:**

Regular class attendance is expected of all students, and class attendance will be recorded. Absences from class will be classified as “documented” or “undocumented”. A documented absence is one where written documentation is submitted supporting an absence from class due to circumstances beyond the student’s control. An undocumented absence is any other absence, including one which could qualify as documented if proper documentation were submitted.

Students who have more than two undocumented absences during the semester should expect to see their final grade reduced by 1% for each undocumented absence over 2, and students who have more than 8 undocumented absences will fail the course automatically. The allowance of 2 undocumented absences may be reduced by one for each documented absence over 2 - e.g. a student who has 3 documented absences will be allowed only 1 undocumented absence without grade penalty. (This will not be applied retroactively, though) Note that it is not necessary to document absences unless there are more than two total absences; for most students, this will avoid the need to submit documentation. A student who anticipates the need to miss more than two classes due to athletic competitions or other student activities should review the college’s attendance policy in the catalog, and should then discuss alternatives to class attendance with the professor at the start of the semester.

A documented absence from a hands-on experience session must be made up to receive credit for the experience, but an undocumented absence (or one that is not made up) will result in a 0 being recorded for that experience.

A student who is habitually late will have late arrival for class counted as a half absence for that class, and a student who sleeps through most or all of a given class session will be counted as absent for that class.

You may ask the professor to waive the policy for class attendance (but not hands-on experiences) for you if you have an A average in this course as of the mid-term exam. If you wish to take advantage of this exemption, you must so inform the professor. However, the attendance policy will be reimposed if your subsequent work deteriorates.

## **STUDENTS WITH DISABILITIES:**

Our academic community is committed to providing access to a Gordon education for students with disabilities. A student with a disability who intends to request academic accommodations should follow this procedure:

1. Meet with a staff person from the Academic Success Center (ASC) and provide them with current documentation of the disability.
2. Obtain a Faculty Notification Form from the Academic Success Center, listing appropriate accommodations
3. Submit this form to professors and discuss those accommodations with them, ideally within the first two weeks of classes.

Some accommodations need more time to arrange so communicating early in the semester is important. For more information consult the Academic Success Center webpage: <http://www.gordon.edu/academicaccessibility> or email [asc@gordon.edu](mailto:asc@gordon.edu).

## TENTATIVE COURSE SCHEDULE (SUBJECT TO CHANGE)

<u>Date</u>	<u>Topic(s)</u>	<u>Reading</u>	<u>Written Work Due</u>
R 8/30	Course Introduction / Overview of Computing Systems	(ch. 1)	
T 9/4	The Binary System	ch. 2	Ch. 1 homework due
R 9/6	Representing Various Kinds of Numbers; Representing Text	§3.1-3.3	Ch. 2 homework due
T 9/11	Representing Media	§3.4-3.6	Ch. 3 homework A due
R 9/13	Gates	ch. 4	Ch. 3 homework B due
T 9/18	Computing Components	ch. 5	Ch. 4 homework due
R 9/20	Machine and Assembly Language	§6.1-6.4	Ch. 5 homework due
T 9/25	Algorithms	§6.5; §7.1-7.5	§6.1-6.4 homework due
R 9/27	Hands-On Experience: Introduction to Python and JES		
T 10/2	Programming in Python	§1.1-1.8 of Python Supplement on Blackboard	§6.5-7.5 homework due
R 10/4	Algorithms on Pictures		Python homework due
T 10/9	Object-Oriented Programming	ch. 9	
R 10/11	Hands-On Experience: Manipulating Pictures with Python		Ch 9. homework due
T 10/16	<b>MIDTERM EXAM (Through ch. 9)</b>		
R 10/18	<b>QUAD BREAK</b>		

<u>Date</u>	<u>Topic(s)</u>	<u>Reading</u>	<u>Written Work Due</u>
T 10/23	Operating and File Systems	§10.1, §11.1-11.2	(Start work on Computer Application in Major Paper)
R 10/25	Hands-on Experience: The Command Line		
T 10/30	Information Systems	ch. 12	ch 10-11 homework due
R 11/1	Structured Query Language (SQL)		ch. 12 homework due
T 11/6	<b>Day of Prayer (No class)</b>		
R 11/8	Hands-on Experience: Database Access Using SQL		Brief Description of Paper Topic Due
T 11/13	Artificial Intelligence	§13.1-13.3; §13.5-13.6	
R 11/15	Artificial Intelligence (ctd); Machine Learning	§13.4; Additional reading posted on Blackboard	ch. 13 homework due
T 11/20	Computer Networks	ch. 15	Machine Learning homework due
R 11/22	<b>THANKSGIVING BREAK</b>		
T 11/27	The World-Wide Web; HTML	ch. 16	ch. 15 homework due
R 11/29	Hands-on Experience: HTML		Computer Application in Major Paper Due
T 12/4	Security	ch. 17	ch. 16 homework due
R 12/6	Limits of Computing	ch. 18	ch. 17 homework due
T 12/11	Oral Presentations: Computer Application in Major		ch. 18 homework due
R 12/13	Oral Presentations (continued); If time, Review and Catch-Up		
R 12/20	<b>9-11 AM FINAL EXAM Cumulative, with emphasis on material since MidTerm)</b>		