

**West Virginia University**  
Computer Science and  
Electrical Engineering  
**Spring 2020**

**CS 221 Analysis of Algorithms**  
Section 1, 3 credit hours  
TR 12:30pm – 1:45pm, ESB 251  
**Prerequisite:** CS 220 – Discrete Mathematics

**Instructor** Gianfranco Doretto 357 Advanced Engineering Research Building  
[gidoretto@mix.wvu.edu](mailto:gidoretto@mix.wvu.edu) 293-9133  
Office hours: Thursdays 2:00pm-3:00pm or by appointment (send email)

### **Required Texts**

*Introduction to Algorithms, Third Edition*

Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein  
The MIT Press, ISBN 0-262-03384-4, September 2009

### **Communication and Supplementary Materials**

Course announcements, homework, study aids, and supplementary reading will be posted on eCampus. Students should regularly check the eCampus course page, and their MIX email.

For class discussion we will be using Piazza. The system is highly catered to getting you help fast and efficiently from classmates, the TA, and myself. Rather than emailing questions to the teaching staff, I encourage you to post your questions on Piazza. If you have any problems or feedback for the developers, email [team@piazza.com](mailto:team@piazza.com).

Find our class page at: <https://piazza.com/wvu/firstsemester2020/cs221/home>

### **Course Content**

This course will cover basic combinatorial algorithm design techniques including divide and conquer, and dynamic programming. Problem domains will include searching, sorting, and graph algorithms. We will cover the basic techniques for analyzing the time and space efficiency of algorithms. If time permits, the course will include a brief introduction to the theory of computational complexity.

### **Course Learning Outcomes**

- a) Design, and understand the theoretical foundations of algorithms
- b) Analyze the complexity and correctness of an algorithm

**Evaluation** 4 Quizzes (12% each), 1 Midterm (26%), Final (26%).

**Grading** 85% - 100% A  
75% - 84.99% B  
65% - 74.99% C  
50% - 64.99% D  
< 50% F

### **Homework Policy**

Homework problems will be distributed to the class on a regular basis. You may discuss homework with other students, but each student is very strongly encouraged to write up solutions in their own words, and without assistance from anyone. Although homework problems will not be graded,

being able to solve homework problems and write appropriate solutions is extremely important for training the student on solving problems of the same type of those presented in class, during quizzes, midterm and final.

### **Attendance**

You must attend class promptly and regularly. *Any unexcused absence forfeits the right of the student to make up the work missed.* You are responsible for all material presented in class, including announcements about course procedures. In addition to text material, tests will include material presented only in class, so performance will indirectly reflect attendance. There is much evidence to support the claim that you will do better in the class if you attend regularly.

### **Tentative Topics**

- growth rate of functions
- polynomial time verses exponential time
- asymptotic notation
- time analysis of algorithms
- divide and conquer technique
- time analysis of recursive algorithms
- recurrences
- priority queues (heaps)
- sorting techniques
- linear time sorting
- breadth first search
- depth first search
- dynamic programming introduction
- minimum spanning trees
- shortest paths

### **The Statler College Smart Device Policy**

*The use of programmable calculators or smart devices (including smart-phones, smart watches, tablets, cameras, wearable devices, etc.) on exams and quizzes prohibited unless specifically indicated by the instructor.*

### **Intellectual Property Statement**

*All course materials, including lectures, class notes, quizzes, exams, handouts, presentations, and other course materials provided to students for their courses are protected intellectual property. As such, the unauthorized purchase or sale of these materials may result in disciplinary sanctions under the [Student Conduct Code](https://studentconduct.wvu.edu/campus-student-code). (<https://studentconduct.wvu.edu/campus-student-code>)*

### **Appropriate Use of Technology Statement**

*Use of technology in the classroom should always be directly related to class activities and/or course learning outcomes. Inappropriate technology use can be an impediment to learning and a distraction to all members of the class. As such, inappropriate use of technology in the classroom may be considered a disruption of the class and constitute a violation of the [WVU Student Conduct Code](#) and could potentially result in a referral to the Office of Student Conduct. Use of technology in the classroom when specifically prohibited by the instructor may also constitute a violation of WVU's [Academic Integrity](#) policy.*

### **Adverse Weather Commitment**

*In the event of inclement or threatening weather, everyone should use his or her best judgment regarding travel to and from campus. Safety should be the main concern. If you cannot get to class because of adverse weather conditions, you should contact your instructor as soon as possible. Similarly, if I am unable to reach the class location, I will notify you of any*

*cancellation or change as soon as possible, using agreed upon methods (by one hour before class starts, using MIX and eCampus), to prevent students from embarking on any unnecessary travel. If you cannot get to class because of weather conditions, I will make allowances relative to required attendance policies, as well as any scheduled tests, quizzes, or other assessments.*

### **Inclusivity Statement**

*The West Virginia University community is committed to creating and fostering a positive learning and working environment based on open communication, mutual respect, and inclusion.*

*If you are a person with a disability and anticipate needing any type of accommodation in order to participate in your classes, please advise your instructors and make appropriate arrangements with [the Office of Accessibility Services](https://accessibilityservices.wvu.edu/). (<https://accessibilityservices.wvu.edu/>)*

*More information is available at the [Division of Diversity, Equity, and Inclusion](https://diversity.wvu.edu/) (<https://diversity.wvu.edu/>) as well.*

### **Academic Integrity Statement**

*The integrity of the classes offered by any academic institution solidifies the foundation of its mission and cannot be sacrificed to expediency, ignorance, or blatant fraud. Therefore, I will enforce rigorous standards of academic integrity in all aspects and assignments of their courses. For the detailed policy of West Virginia University regarding the definitions of acts considered to fall under academic dishonesty and possible ensuing sanctions, please see the West Virginia University [Academic Standards Policy](http://catalog.wvu.edu/undergraduate/coursecreditstermsclassification) (<http://catalog.wvu.edu/undergraduate/coursecreditstermsclassification>). Should you have any questions about possibly improper research citations or references, or any other activity that may be interpreted as an attempt at academic dishonesty, please see your instructor before the assignment is due to discuss the matter.*