Birmingham-Southern College

Department of Mathematics and Applied Computer Science
CAC 210: Data Structures and Media Computation
Fall 2022

Course Instructor:

Dr. Amber Wagner
Office: Olin 208
Email: anwagner@bsc.edu (best way to reach me)
Book an appointment: wagner-9.youcanbook.me
Anonymous feedback: sayat.me/anwagner

A little about me…I have been a dancer for most of my life, and I still dance. As a high school student, I assisted and taught numerous dance classes, which is where I found my love for teaching. I started teaching computer science to grades 7 through 12 at the Alabama School of Fine Arts (ASFA) in 2004. I spent three incredible years at ASFA where I had the privilege of teaching fantastic individuals who taught me as much, if not more, than I taught them. I have also used my computer science degree as a project manager and software developer for Kennesaw State University where I was recently an assistant professor. I earned my PhD in Computer Science from the University of Alabama under the advisement of Dr. Jeff Gray.

Course Description:

An advanced programming survey. Data structures to be covered include lists, stacks, queues, trees, and graphs, in addition to searching and sorting algorithms. Assignments will involve the manipulation of media such as art and music. Prerequisite: CAC 180.

Major Course Activities:

- Assignments: 4 large programming projects will be assigned throughout the term.
- Mini-Assignments: These will be small programs or assignments to complete.
- There will be a midterm exam.
- Final project: A research project on an algorithm of your choice in addition to the implementation of that algorithm.

Course Delivery Description:

This course will meet in person in Olin 201 M/W 11:00-12:20. Attendance is highly encouraged. If you are unable to attend, please be sure to review the material posted online. Class sessions will include lecture and labs where we will be executing what we are learning on the computer. Please plan to bring your personal computer or use a lab computer during each class session.

Course Prerequisites:

CAC 180 (preferably, CAC 190)

Required Course Materials:

- Required: ZyBook, you will get a digital code from the bookstore.
- Java For Python Programmers: https://runestone.academy/runestone/books/published/java4python/index.html
- Some references will be provided online.

Technology Requirements:

You will need an IDE for Java. I highly recommend Eclipse (instructions posted on Moodle). You are welcome to use the lab computers, or you can use your IDE of choice.

IT Helpdesk offers telephone, email, and in-person support to all Birmingham-Southern students and employees. Please view the Student Quick Guide for information on how to access BSC technology tools. Hours of operation are listed below.

> ***Hours of Operation***
> *Email: helpdesk@bsc.edu, Monday-Friday, 7:30 a.m.- 4 p.m.*
> *Phone: 205-226-3033*
> *24/7 Hotline via Apogee: 1-877-478-8861*
> *Web address: www.bsc.edu/campus/it/helpdesk.html*

Student Learning Outcomes (SLOs):

At the conclusion of this course, students will be able to:

SLO-1 Analyze the efficiency of an algorithm
SLO-2 Create algorithms using basic data structures
SLO-3 Solve problems using data structures
SLO-4 Solve problems using recursive algorithms
SLO-5 Evaluate the best algorithm and data structure to use when solving a given problem

Instructional Method and Learning Strategies:

The course will consist of lectures followed by hands-on activities to practice what was discussed in the lecture. There will be readings, quizzes on the readings, and discussions about the readings, a midterm exam, small programming assignments and larger projects. A final project will be assigned in lieu of a final exam. The primary teaching style utilized will be active learning. There will be group work, independent research, problem-solving activities, and analytical writings throughout the course.

Course Outline/Schedule:

The final course outline/schedule will be posted in Moodle, but the below is a tentative schedule. The readings will consist of articles or other online material.

Date/Week	Topics	Important Dates/Activities
8/24-8/26 Week 1	Intro to course Java Look at a Java program	The ZyBook was included in your textbook fee. You should have received a digital code to use from the bookstore. (Z) Java for Python Programmers (JPP)
8/29-9/2 Week 2	Java Data Types Java Conditionals Java Loops	JPP: Read Java Data Types, Java Conditionals, Java Loops 9/1 – Mini-Assignment #1 Due
9/5-9/9 Week 3	9/5 No Class **9/7 Class Online** Java Classes	JPP: Java Classes 9/5 – No Class 9/7 – Last day to add a class, **class online** 9/13 – Mini-Assignment #2 Due
9/12-9/16 Week 4	**9/12 Class online** Java Classes	9/14 – Last day to withdraw with tuition refund
9/19-9/23 Week 5	Java Classes	9/21 – Last day to drop without a grade
9/26-9/30 Week 6	Linked Lists Introduction to Data Structures and Algorithms Searching and Algorithm Analysis	Z: Chapter 1, Chapter 2 9/28 – Mini-Assignment #3 Due 9/30 – Project #1 Due
10/3-10/7 Week 7	Sorting and Analysis	Z: Chapter 3 10/5 – Midterm 10/6 – Mini-Assignment #4 Due
10/10-10/14 Week 8	Lists, Stacks and Queues Hash Tables	Z: Chapter 4, Chapter 5 10/14 – Project #2 Due 10/12 – Last day to drop with a “W”
10/17-10/21 Week 9	Trees	Z: Chapter 6 10/21 – Mini-Assignment #5 Due

Date/Week	Topics	Important Dates/Activities
10/24-10/28 Week 10	Balanced Trees	Z: Chapter 7 10/28 – Project #3 Due
10/31-11/4 Week 11	Heaps and Treaps Sets	Z: Chapters 8 and 9 11/4 – Mini-Assignment #6 Due
11/7-11/11 Week 12	Graphs	Z: Chapter 10 11/11 – Mini-Assignment #7 Due
11/14-11/18 Week 13	Algorithms	Z: Chapter 11 11/18 – Project #4 Due
11/21-11/25 Week 14	Algorithms	**11/23-11/25 – No School, Happy Thanksgiving!** 11/22 – Mini-Assignment #8 Due
11/28-11/30 Week 15	Algorithms	11/30 – Last day of class 12/1 – Mini-Assignment #9 Due
12/2-12/8 Week 16	Finals Week	12/6 4:00PM – Final Project due

Course Activities, Assessments, & Interactions:

This course consists of a sequence of activities, assessments, and interactions to support you in achieving the Student Learning Outcomes (SLO) for this course. You will engage in weekly activities, discussions, research, readings, quizzes, a research paper, and one exam. The primary course artifacts required to achieve the Student Learning Outcomes (SLO) are described below:

Discussions

Active participation is required for this course. There will be regular discussions regarding the readings, which will come from articles posted on Moodle.

Participation

Throughout the course, there will be worksheets and/or lab activities distributed during class for students to solidify their understanding of lectures or expand upon what was covered in the lecture. If students are not in class (either physically or remotely), they are unable to participate.

Final Project
This final project is half research and half coding. The research portion should be 2-3 pages. The coding portion is dependent on the project chosen.

Assignments
There will be 4 large assignments and 9 mini-assignments throughout the course. Please do not procrastinate in starting these assignments. The mini-assignments are intended to keep you programming a little each week.

Midterm Exam
This will be an in-class, closed book exam.

Grading:

ACTIVITY	Weight
Participation/Quizzes	**5%**
Projects	**40%**
Mini-Assignments	**30%**
Midterm Exam	**10%**
Final Project	**15%**

Grading Scale

A	93-100%	B-	80-82%	D+	68-69%
A-	90-92%	C+	78-79%	D	60-67%
B+	88-89%	C	73-77%	F	0-59%
B	83-87%	C-	70-72%		

Getting Started with this Course:

Moodle Learning Management System
Students are responsible for checking Moodle for course readings, assignments, and announcements. Work that is passed in late because of not checking Moodle is the responsibility of the student. You are also required to check your grades on Moodle to verify that the correct grades are recorded for your completed work.

Logging into Moodle
Birmingham-Southern College uses the Moodle Learning Management System (LMS). To get started with the course, do the following:

1. Log onto the BSC access point by going to: moodle.bsc.edu.
2. Enter your BSC username and password.
3. The Moodle dashboard will open, and your courses will be displayed in the middle of the screen.
4. Select your course to begin.
5. The course welcome page will open. Read the welcome section and follow the instructions for getting started.

You will need your BSC User Name and Password to log in to the course. If you do not have or don't know your User Name, contact the IT Help Desk at 205-226-3039 or helpdesk@bsc.edu.

Course & College Policies:

Attendance
Plan to attend class. If you must miss, please refer to Moodle for any missed work as well as the recorded lecture.

Assignments
Assignments will be due as posted on Moodle. All instructions regarding submission format will be on Moodle. Assignments not following the protocol stated on Moodle will not be graded. Late submissions will be penalized 5% per day and will not be accepted more than 3 days late.

Masking Policy
Masking is optional at the start of the term, but I reserve the right to request that we mask in class based on updates from the CDC.

Academic Integrity
Adhere to the honor code at all times: As a member of the student body of Birmingham-Southern College, I recognize my responsibility to the traditions of the institution, to my fellow students and to myself. I recognize the significance of the honor system. I pledge that I have read and understand the Constitution of the Honor Council, including the Honor Code, and agree to be bound by its provisions.

Additional information on the honor code and violations can be found in the Birmingham-Southern Student Handbook and on the BSC website.

Netiquette
1. Check your email often--this is the method the instructor will use most often to communicate with you.
2. Adhere to the same standards in your digital communications as you would for traditional written language.

3. Use clear and concise language.
4. Remember that all college level communication should have correct spelling and grammar.
5. Be cautious when using humor or sarcasm as tone can be lost in an email or discussion post.
6. Using all capitals is the equivalent of SHOUTING and considered RUDE.

Student Grievance Policy
Students should follow the complaint process as outlined in the current Birmingham-Southern College Student Handbook.

Academic Accessibility and Accommodations
Students with a disability that qualify under the Americans with Disabilities Act (ADA) and/or Section 504 of the Rehabilitation Act and require accommodations should be registered with BSC's Accessibility Office. If you are registered for academic accommodations, please make an appointment with me as soon as possible to discuss any accommodations that may be necessary. During this discussion you are not expected to disclose any details concerning your disability though you may do so at your discretion. If you have a disability but have not yet registered, please contact Dr. Sandra Foster, Assistant Director of Accessibility Services and Resources, at 205-226-7909 or smfoster@bsc.edu, or visit Norton 228. Keep in mind that no accommodation will be made unless and until the instructor receives official notification from the College.

Title IX
Birmingham-Southern College is committed to the creation and maintenance of a safe learning environment for students and the campus community. The College forbids any type of sexual or gender-based misconduct among its students, faculty, and staff. The College encourages all members of the academic community to report suspected sexual and gender-based misconduct to the appropriate authorities so that it can be investigated, remedied, and eliminated. BSC forbids retaliation against any person who has opposed, reported, or participated in an investigation concerning sexual or gender-based misconduct. See the BSC Title IX website (www.bsc.edu/titleix) for more information, including an online report form. If you or a peer have experienced such misconduct, there are faculty and staff members who are trained in supporting students by answering questions and helping them navigate this process. The list of advocates can be found along with other helpful resources on the Title IX website.

BSC Resources for Writers and Readers
Located in Humanities 102, the BSC Writing Center offers in-person and virtual peer-to-peer tutoring and quiet, supportive lab space to work on writing assignments. The Center's tutors are students from a wide variety of majors on campus and have the range to address student writing needs with discipline specificity. Supervised and assisted by BSC Writing Center directors, the tutors provide one-on-one consultations for any student at any point in the writing process. The BSC Writing Center is open Sunday-Thursday 4pm-8pm. To ensure a full 30-minute tutorial time slot, students are encouraged to be mindful of assignment-heavy weeks, keep track of due dates, and visit the Writing Center at their earliest availability during

open hours. Please contact Dr. MK Foster or Professor Laura Tolbert (writingcenter@bsc.edu) with any questions or requests for virtual appointments.

Inclement Weather

Inclement weather or other events beyond the control of the College that might cause risk or danger to students, faculty, and staff may occasionally result in changes to normal College operations, including cancellation of classes or events; the calendar schedule may be adjusted.