**CAC 170A: Computer Science Principles**

**Spring 2023**

**Course Description**

This is a foundational course in computing. Topics will include ethics, correlation between computing and other fields, networking and security, and an introduction to programming/logical thinking.

**Professor Information**

Dr. Anthony Winchester

Office: Olin 209

Email: [agwinche@bsc.edu](mailto:agwinche@bsc.edu)

Meeting Times: TTH 12:30 pm – 1:50 pm

Location: Olin 201

Office Hours: MW 2:00 pm – 5:00 pm

Or by appointment

**Course Website**

All course information will be posted on Moodle including assignments, readings, quizzes, and other important dates. Please be sure to check your courses on Moodle frequently to keep up with due dates and notes.

**Texts**

Two texts are required for this course. Both are available online for free; therefore, the campus bookstore does not have them in stock.

1. [B2B] Abelson, H., Ledeen, K., and Lewis, H. *Blown to Bits: Your Life, Liberty, and Happiness After the Digital Explosion*. 2008.

Please note: This book can be downloaded for free from <http://www.bitsbook.com/> or a printed version can be purchased online: ISBN 0-13-713559-9.

1. [CSP] CS Principles: Big Ideas in Programming. Available online only at <http://interactivepython.org/runestone/static/StudentCSP/index.html>.

Short papers will be distributed throughout the semester via Moodle, please be sure to check Moodle on a regular basis to ensure you are up to date on deadlines and readings.

Extra resources will also be posted on Moodle. These are for your benefit and can help explain concepts being covered from other perspectives.

**Tentative Course Outline/Important Dates**

Outline is subject to change.

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| --- | --- | --- | --- |
| **Date** | **Topic** | **Readings (to be completed prior to class)** | **Assignments (to be completed after class)** |
| January 31 | Intro to Course  Syllabus  Number Systems |  | Moodle: Student feedback – all about you |
| February 2 | Binary Number System | B2B Chapter 1 | Assignment #1 – Binary Numbers |
| February 7 | Privacy | B2B Chapter 2 | Assignment #2 – Pixelation  Impact Essay Assigned |
| February 9 | Data Representation | B2B Chapter 3 |  |
| February 14 | Hardware |  | Assignment #3 – Computer Hardware |
| February 16 | Logic and Abstraction | Article #1 |  |
| February 21 | Python  - Introduction - Jupyter Notebook Overview - Variables | CSP Chapter 3 |  |
| February 23 | Python: Strings  Algorithms | CSP Chapter 4 | Assignment #4 – Programming Math Example |
| February 28  **\*Last day to drop with no grade** | **Continuation of Strings** |  |  |
| March 2 | Python: Loops | CSP Chapter 7 |  |
| March 7 | Python: Loops | CSP Chapter 8 | Python Programming Assignment #1 |
| March 9 | Python: Decisions | CSP Chapter 12 |  |
| March 14 | Python: Decisions Part 2 | CSP Chapter 12 | **Impact Essay Due** |
| March 16 | Python: Lists | CSP Chapter 16 | Python Programming Assignment #2 |
| March 21 | **Spring Break: No Class** |  |  |
| March 23 | **Spring Break: No Class** |  |  |
| March 28  **\*Last day to drop with “W”** | Python: Lists | CSP Chapter 17 |  |
| March 30 | Python: Lists | CSP Chapter 18 | Assignment #5 – Quick IP Address Assignment |
| April 4 | Internet Searching | CSP Chapter 20  B2B Appendix  Article #2 | Python Programming Assignment #3  (Select one from Category A, one from Category B, and one from Category C) |
| April 6 | Internet Searching | B2B Chapter 4 |  |
| April 11 | Accessibility | Article #3 | Assignment #6 – What is the Internet  Assignment #7 – Replying to Spam Emails  Ethics Essay Assigned |
| April 13 | Crowdsourcing |  |  |
| April 18 | Cybersecurity | B2B Chapter 5 |  |
| April 20 | Big Data/Excel |  | Data Analysis Assigned |
| April 25 | Big Data/Excel |  |  |
| April 27 | Censorship on the web | B2B Chapter 8 | **Data Analysis Due** |
| May 2 | Class Discussion  Q&A of Final Project **Last Day for this Class** |  | **Ethics Essay Due**  **Final Project Assigned** |
| May 4 | **Honors Day – No Class** |  |  |
| May 16 | **Final Project Due no later than 12:00pm** |  |  |
| May 25 | **Fall Term Grades Available** |  |  |

**Major Assignments**

* Essay reflecting the impact of computing in desired field
* Essay on ethics of computing
* Data analysis assignment; questions requiring students to analyze data and to explain the meaning
* 7 small lecture comprehension assignments
* 3 Python assignments
  + One Python assignment will be a team assignment
  + One Python assignment will involve data
* Final project – large Python programming project

**Assessment**

Impact of computing essay 10%

Ethics essay 10%

Data analysis assignment 10%

Assignments 40%

In Class/Reading Quizzes 10%

Final Project 20%

**Major/Program Learning Outcomes**

At the conclusion of the semester, students will be able to

1. Organize and manipulate data
2. Write code for computational problems
3. Optimize alternative computational approaches for enhancing the creation and presentation of raw material

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| --- | --- |
| **Course Outcomes** | **Assessment Methods/Metrics** |
| Students will learn to analyze the effects of computation including the impacts of computing, the connection between people and computing, and the connection between fundamental computing concepts. | Students will research how CS impacts an area of interest. Students will also perform an exam including these topics. |
| Students work in teams to develop the project, gather and study appropriate resources (references) for understanding the project’s application domain, and demonstrate the project’s utility to the instructor and peers | Operate in teams to develop the project, acquire and use resources (references) pertaining to the project’s application domain, and demonstrate the project’s functionality. |
| Students will demonstrate a solid understanding of abstraction in the context of languages as well as models. | Students will complete an assignment to research a computer model and explain how it works, what abstraction means, and why models and abstraction are beneficial to use a model. An exam will be given to further evaluate the students’ understanding. |
| Students have a good understanding of topics pertaining to professional, ethical and social aspects of the software engineer’s job and activities. | Discuss topics pertaining to professional, ethical and social aspects of the software engineer’s job and activities. |
| Students create individual projects to include design elements (pseudocode and flowcharts). Additionally, students will be able to demonstrate problem solving and troubleshooting abilities. | Complete three individual projects to express an understanding of algorithmic logic and identifying errors and solutions to given problems. |
| Students will learn how to work with large data sets. | Students will use a database in conjunction with an individual programming assignment in addition to evaluating how models utilize data in a second individual assignment. |

**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.

It is expected all written assignment to be saved and submitted on Moodle as a PDF.

**Programming Assignments**

Programming assignments must provide user with clear instructions for testing of the code. Use of the web is limited to gaining understanding of concepts, examples of topics and use of concepts. Direct re-transcribing/copy and pasting of answers of the code is unacceptable. All programming assignments will be submitted from the Jupiter Notebook editor. I reserve the right to ask questions about the program you have developed. This is to verify your understanding.

**Programing Rubrics**

|  |  |
| --- | --- |
| Category | Points |
| Primary concept being evaluated is present (input/output, variable, conversions, decision statements, loops) | 30 |
| Program runs without an error | 30 |
| User prompts for program are clear (user knows what to do once program starts execution) | 15 |
| Program runs as problems dictates | 15 |
| Program is WELL Commented | 10 |

**Late Submission**

Assignment will not submitted by the due dates detailed in Moodle **will not be accepted.** A grade of zero will be given.

**Accommodations**

If you are registered for accommodations/ academic adjustments, please make an appointment with me as soon as possible to discuss accommodations/ academic adjustments that may be necessary. During this discussion, you are not expected to disclose any details concerning your disability, though you may discuss these details at your discretion. If you have a disability but have not contacted Sandra Foster, the Coordinator of Accessibility at BSC, please call 205-226- 7909 or visit Counseling and Health Services on the second floor of Norton Center to initiate the process. You may also contact her at [smfoster@bsc.edu](mailto:smfoster@bsc.edu) if you have any questions or need more information. Her office hours are Mondays – Fridays 8: 30 – 4:30. An appointment is recommended.

**BSC 's Academic Resource Center (ARC)**

The Academic Resource Center (ARC), located on the ground floor of the Library, offers drop-in tutoring and one-on-one assistance for all BSC students. We offer assistance in Accounting, Arabic, Biology, Business, Chemistry, Chinese, Economics, History, Latin, Marketing, Music Theory, Philosophy, Physics, Physiology, Political Science, Psychology, Religion, Sociology, Spanish, and Statistics. Peer tutoring is free and tutors spend an hour or more per one-on-one appointment, and there is no limit to the number of tutoring sessions you can have. Also feel free to stop by during regular drop-in hours (Monday-Thurs, 7- 9 p.m. for assistance without an appointment). For more information or to make an appointment email [arc@bsc.edu](mailto:arc@bsc.edu) or visit the [Academic Resource Center web page](https://www.bsc.edu/academics/arc/index.html) and submit a form. Reach out to us, we can help!

**BSC Resources for Writers**

The Writing Center is located in Humanities 102, and it has a new structure and vibe this year. Two graduate student coordinators will be on site at all times. The Writing Center is open to supervise peer tutors and to conduct tutorials themselves, as needed. We will be open Sunday-Thursday late afternoon and evenings, and students do not need an appointment. Tutorials are about 30 minutes long, free of charge, and available on a drop-in basis. Tutors will not proofread or "fix" student papers. They will provide one-on-one consultation about writing issues--small and large--for any student from any major at any point in the writing process. There is no limit to how many tutorials a student may attend. We are here to help!

**Title IX**

Birmingham-Southern College is committed to providing a safe and comfortable learning, living, and working environment for all students, faculty, staff, and campus visitors, free from harassment based on race, color, national origin, ethnic origin, gender, sexual orientation, age, disability, genetic information, or veteran status. BSC will not tolerate and will take action against any individual who seeks to engage in harassing behavior. Any student, faculty, or staff member who has concerns about gender discrimination or sexual harassment, sexual assault, or sexual violence is encouraged to seek the assistance of the Title IX Coordinator or other individuals at the College they may be comfortable disclosing to for support assistance.

**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.